Robert Wood Johnson Foundation

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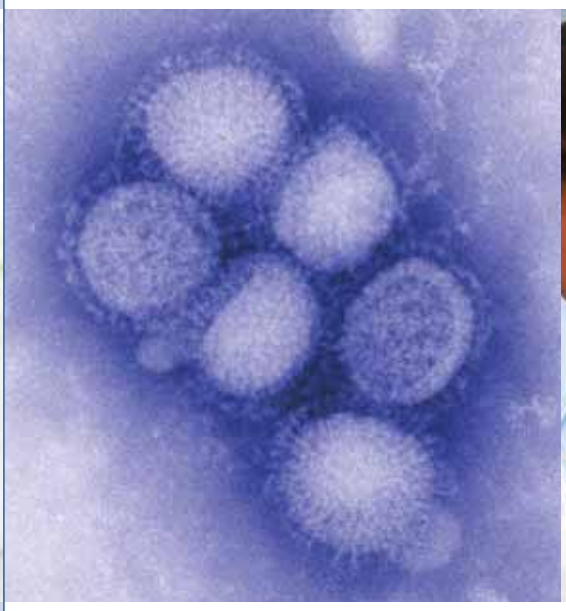
ISSUE BRIEF

H1N1 Challenges Ahead



> "Although we were fortunate not to see a more serious situation in the spring when we first got news of this outbreak... the potential for a significant [H1N1] outbreak in the fall is looming. We want to make sure that we are not promoting panic, but we are promoting vigilance and preparation."
>
> -- President Barack Obama at the Flu Summit[1]

- In June 2009 the World Health Organization (WHO) raised the pandemic flu alert to six, the highest level, which indicates a global pandemic is underway. This is the world's first influenza pandemic since 1968.[2]
- H1N1 has spread to all states and D.C., hospitalizing almost 10,000 people and killing close to 600 people as of September 2009.
- Twenty-six states were reporting widespread influenza activity as of September 19, including: Alabama, Alaska, Arizona, Arkansas, California, Colorado, Delaware, Florida, Georgia, Illinois, Kansas, Kentucky, Louisiana, Maryland, Minnesota, Mississippi, Nevada, New Mexico, North Carolina, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, and Washington. Any reports of widespread influenza activity in September are very unusual.
- Monitoring has shown that the virus remains virtually identical to initial outbreaks and it has not mutated to a more virulent or lethal form.[4]

OCTOBER 2009

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Introduction

As the United States gets ready for an increase in H1N1 flu virus activity this fall, there are a number of challenges the country faces.

Federal, state, and local governments, health care providers, businesses, schools, and communities around the country are taking extraordinary measures to respond to the second wave of H1N1, when a significant percentage of Americans could become sick from the H1N1 virus. According to a planning scenario developed by the President's Council of Advisors on Science and Technology (PCAST), if 30 percent of the U.S. population contracted H1N1, it could mean around 90 million Americans could get ill, 1.8 million could need to be hospitalized, and around 30,000 could die.[5]

The country is much better prepared to face a pandemic than it was just a few short years ago. The investments that have been made to improve pandemic preparedness have resulted in significantly enhancing the country's ability to respond to an influenza pandemic. These investments have increased the country's vaccine manufacturing capacity, provided helpful awareness and education campaigns, contributed to a more robust federal stockpile of antiviral medications, improved many core facets of the nation's public health system, and assisted in the development of federal, state, local, community, business, and school pandemic plans. Since 2005, a strong National Strategy for Pandemic Influenza has been developed, and every state has a pandemic plan, which are constantly being revised and refined.

However, there were also many concerns that were identified, but were not adequately addressed or funded in prior planning efforts. Some very large underlying issues, including how to manage surge capacity during a mass event, developing a reimbursement system for uncompensated care during an emergency, and the need to modernize and strengthen, in a sustained way, much of the public health infrastructure, are still major challenges. In addition, before this year, policies called for many preparedness functions to be state and local responsibilities and did not provide federal support for these needs, including vaccine distribution and the expectation that states should purchase a significant portion of antiviral medications to protect their own citizens.

Since the emergence of H1N1 this spring, officials have been racing against the clock to address many of the remaining issues. Congress appropriated $1.9 billion in emergency supplemental funding and an additional $5.8 billion in contingency funding, some of which has already been tapped by the Obama Administration, to enhance vaccine production, help bolster state and local health department capacity, upgrade surveillance capabilities, and meet other needs. In the last few months, $1.4 billion has been drawn from the available funds to assist states in their pandemic response and vaccination implementation programs.

This fall and winter, federal, state, and local health departments will undertake the most ambitious vaccination plan in U.S. history, by making the H1N1 vaccine available to all Americans and particularly targeting high-risk groups as soon as it is ready. The U.S. Food and Drug Administration (FDA) has approved vaccines for H1N1 and a vaccine distribution policy was created in so far as the U.S. Centers for Disease Control and Prevention (CDC) has set up a system to process orders and deliver vaccine when it is available to locations identified by each state. HHS has also worked with health departments, hospitals, and other providers to rapidly improve surveillance capabilities to be able to track and monitor the spread of the virus. Federal, state, and local officials have been also working hard to educate the public about H1N1 issues and ways to best prepare for and protect themselves during the outbreak.

But many challenges still remain:

- **Vaccine Issues:** One major challenge the country faces is that only a limited amount of the vaccine will be available by October, when the flu is expected to become more widespread. Communities and health care systems will therefore have to prepare for how to manage until a vaccine is widely available, by anticipating high levels of needed care and finding ways to limit the spread of disease by encouraging people to practice good hygiene habits and for those who are sick to limit contact with others. Communities will have to plan how to reach high-risk groups early, when supplies are low, and the rest of the population as more vaccine becomes available. Since the vaccine may not be made widely available until later in the outbreak, it may deter many individuals from seeking out the vaccine, since they may feel the risk has di-

minished. However, experts recommend everyone still get vaccinated because a third wave of the disease could emerge next year.

- Once a vaccine is available, an additional challenge will be to get it to young adults, who are considered to be at particularly high-risk for contracting H1N1, and to minority populations, who have high rates of underlying health conditions which make them more vulnerable to H1N1. Historically, low levels of young adults and minority communities receive seasonal flu vaccinations.

- **Competing Seasonal Flu:** Another challenge is that the seasonal flu will also be circulating at the same time as H1N1. Typically, the seasonal flu sickens between five and 20 percent of the U.S. population, leads to an average of more than 200,000 hospitalizations, and results in about 36,000 deaths from flu-related causes.[6] This may create added confusion around who has which kind of flu and put increased strain on the health system. There are some reports that H1N1 could be "crowding out" the regular seasonal flu and may result in reducing cases of the seasonal flu.

- **Strain on Medical System:** Surge capacity, which is the ability of the medical system to care for a massive influx of additional patients, is one of the most serious remaining challenges for emergency health preparedness. Health care providers and hospitals could be quickly overrun or overextended during the H1N1 outbreak, even though it is currently a mild strain of flu, and the plans and capacities to deal with this influx are limited. Federal, state, local, and health system officials will have to continue to clearly communicate with the public as to which groups are urged to seek rapid care and who should practice sound self-care measures and stay home when ill.

- **Eroding Public Health Infrastructure:** One of the biggest ongoing challenges health officials face is that preparations are taking place in the context of a public health system that has been chronically underfunded for decades. Many core systems and capabilities are lagging behind where they should be or could be, which leaves the nation unnecessarily vulnerable during times of emergency. The concurrence of lost workforce due to the economic recession, the continuing need to address other pressing public health issues simultaneously with a pandemic, and the diversion of health department employees to the H1N1 response have placed a severe strain on the public health system.

This report examines the series of challenges the country faces in preparing to deal with the complications that an H1N1 outbreak adds to this flu season related to medical care capacity, antiviral medications, disease surveillance, vaccinations, budget cuts at public health departments, and caring for people in communities, particularly meeting the special needs of at-risk populations, and provides a series of recommendations for how to address preparedness gaps.

Pandemic Influenza Preparedness and Response: 2009 HHS Funds for H1N1
(dollars in millions)

	HHS Original Appropriations	Contingent Release*	Total Funds
Vaccine Production and Ancillary Supplies *Includes bulk vaccine antigen and adjuvant manufacturing, fill finish, and syringes and needles*	1,117	2,485	3,602
Ongoing Pandemic Influenza Activities with H1N1 Impacts *Includes manufacturer retrofits, clinical trials, antiviral procurements, diagnostic test development, and PPE*	179	232	411
Vaccination Campaign Planning and Implementation: Upgrading State and Local Capacity *Includes Cooperative Agreements for Hospitals and State/Locals*	350	--	350
Vaccination Campaign Planning and Implementation: Vaccine Distribution *Distribution of vaccines and ancillary supplies to receiving sites within the States*	30	213	243
Vaccination Campaign Planning and Implementation: State and Local Vaccine Implementation/Administration *Includes funding to plan and execute a mass vaccination campaign through the Public Health Emergency Response Grants*	--	1,094	1,094
Vaccination Campaign Planning and Implementation: CDC Vaccination Campaign Activities *Includes vaccination monitoring and communications*	--	112	112
Federal, State and Int'l Surveillance & Preparedness – CDC	170	154	324
Compensation, ASPR, and FDA	4	11	15
Total	**1,850**	**4,300**	**6,150**

*A total of $5.8 billion in contingency funds are available at the Administration's discretion. These numbers represent the latest release of funds as of press time.

I. PREPARING FOR SURGE IN MEDICAL CARE

With limited vaccine expected to be available at the start of the outbreak and significant numbers of Americans becoming ill, the health care system could be quickly overwhelmed by a major influx of patients seeking medical care. Health departments, health care providers, and hospitals are preparing for how to manage a surge of potential patients. Patients could rapidly fill existing hospital beds and cause a surge in demand for critical medicines and equipment, such as antiviral medications, ventilators, and protective masks.

During a major emergency like a pandemic outbreak, the health care system could be significantly stretched beyond normal capabilities. Figuring out how to plan for a massive influx of patients is one of the hardest parts of preparing for health emergencies, and it has yet to be adequately dealt with. "Surge capacity" management is one of our biggest public health emergency preparedness weaknesses. Many of the surge capacity problems have been identified – including having enough supplies, staff, and space to treat patients – but solutions to these problems are often lacking.

A. AMBULATORY CARE AND EMERGENCY DEPARTMENTS

In the spring, doctors' offices and hospitals were overrun by patients who had the flu or were concerned they had the flu. During disasters, health providers have to adapt their regular practices to treat a large number of patients very quickly. In an effort to manage the number of patients seeking care, the government is working with physicians in states and local communities to develop telephone hotlines and interactive websites to prevent patients with less severe symptoms from going to the hospital.[7] The U.S. Centers for Disease Control and Prevention (CDC) has provided information and guidance to states and health facilities on how to set up the call centers, based on models similar to poison control centers.

Surge capacity issues are particularly acute in emergency rooms, where in the best of times, they already face capacity shortages and staffing issues. For instance in New York City, one of the places hardest hit by the spring wave of H1N1, hospital and city health officials reported that 44,678 people visited emergency rooms in with flu-like symptoms from May 15 to June 15, compared to just 4,267 the previous year.[8]

With more than 15 percent of Americans lacking health insurance coverage, the financial impact on the country's public health and health care systems could be disastrous if hospitals, community health centers, and primary care facilities treat large numbers of uninsured.[9] Young adults between 19 and 29 years old are considered to be at high-risk for developing more severe cases of H1N1, and they represent one of the largest and fastest growing segments of the population without health insurance.[10] In addition, individuals without insurance often end up going to the emergency room when they need medical care, which results in higher cost care.

Some experts have recommended an emergency health benefit be enacted to ensure care for all Americans during emergencies and to ensure that health care providers receive compensation. Other experts have suggested that Medicaid, Medicare, and private insurers should extend out-of-network benefits during times of emergencies, like a pandemic, so that patients have access to a wider community of doctors and so that hospitals and other facilities can more easily seek compensation if they provide care for out-of-network patients. Expedited enrollment for Medicaid can also be deployed in a crisis, as it was after the September 11th tragedy.

B. HOSPITAL BED CAPACITY

Emergency care centers and doctors' offices are expected to see an influx of patients during the initial phase of the outbreak. But as the pandemic progresses, there will likely be growing need to hospitalize large number of patients who will be in need of more significant care. This becomes even more of an imperative should the severity of the pandemic increase.

In order to illustrate the number of people who could become hospitalized and the capacity of hospitals to meet the potential influx of patients, Trust for America's Health (TFAH) used CDC's FluSurge modeling program to estimate the number of hospitalizations that could occur per state and how quickly this would fill the number of available hospital beds in that state.

The estimates are based on expert predictions that the H1N1 virus is a relatively mild strain of flu, similar to the severity of the 1968 pandemic flu outbreak, and that up to 35 percent of Americans could potentially become sick with H1N1. Based on these assumptions, the number of people who might need to be hospitalized could range from a high of 168,025 in California to a low of 2,485 in Wyoming.

Models for a pandemic outbreak anticipate the pandemic to last for at least eight weeks, reaching its peak at five weeks. Based on the FluSurge estimates, 15 states would exceed their current available hospital bed capacity during the fifth week of the outbreak. In addition, 22 states would reach or exceed 80 percent of their hospital bed capacity and 26 states would exceed 75 percent of their hospital bed capacity.

North Dakota (32 percent), Mississippi (35 percent), and South Dakota (37 percent) would have the highest amount of available bed capacity at peak of the pandemic during week five. Delaware (203 percent) and Connecticut (148 percent) would have the highest overload rates.

These estimates do not take into account Army mobile hospitals or other emergency mobile hospital bed capacity. It is also important to note that the H1N1 pandemic appears to follow a slightly different pattern. Instead of an eight-week wave with the peak of the pandemic occurring during the fifth week, H1N1 appears to have a much earlier, rapid onset reaching its peak at week two or three. Therefore, hospitals and health care providers need to be prepared for a crush of patients as soon as H1N1 becomes widespread in their communities.

Potential Pandemic Influenza Cases, Hospitalizations and Bed Capacity From a 35 Percent Attack Rate Pandemic Flu*

State	Cases	Hospital Admissions	Bed Capacity at Week 5
Alabama	1,631,665	22,525	55%
Alaska	240,203	2,848	58%
Arizona	2,275,063	29,363	117%
Arkansas	999,387	13,839	50%
California	12,864,833	168,025	125%
Colorado	1,728,810	21,927	88%
Connecticut	1,225,438	17,305	148%
Delaware	305,582	4,197	203%
D.C.	207,142	2,904	47%
Florida	6,414,919	95,064	80%
Georgia	3,390,010	42,348	78%
Hawaii	450,869	6,410	143%
Idaho	533,336	6,803	66%
Illinois	4,515,547	60,934	73%
Indiana	2,231,877	30,234	57%
Iowa	1,050,894	14,951	51%
Kansas	980,747	13,331	43%
Kentucky	1,494,236	20,475	52%
Louisiana	1,543,779	20,381	48%
Maine	460,760	6,762	83%
Maryland	1,971,759	26,691	143%
Massachusetts	2,274,288	31,942	110%
Michigan	3,501,198	48,584	79%
Minnesota	1,827,138	24,768	68%
Mississippi	1,028,516	13,810	35%
Missouri	2,069,062	28,587	60%
Montana	338,604	4,706	48%
Nebraska	624,201	8,576	44%
Nevada	910,058	11,639	137%
New Hampshire	460,533	6,419	84%
New Jersey	3,038,931	42,510	101%
New Mexico	694,525	9,273	93%
New York	6,821,604	94,740	108%
North Carolina	3,227,845	42,464	95%
North Dakota	224,518	3,215	32%
Ohio	4,020,069	56,228	70%
Oklahoma	1,274,826	17,375	57%
Oregon	1,326,521	18,155	107%
Pennsylvania	4,356,898	63,573	77%
Rhode Island	367,776	5,358	143%
South Carolina	1,567,930	20,994	93%
South Dakota	281,468	3,861	37%
Tennessee	2,175,211	29,347	61%
Texas	8,514,441	105,287	66%
Utah	957,748	10,839	83%
Vermont	217,445	3,125	108%
Virginia	2,719,181	36,530	100%
Washington	2,292,228	30,474	107%
West Virginia	635,064	9,404	48%
Wisconsin	1,969,788	27,196	75%
Wyoming	186,434	2,485	40%

**Based on the CDC's FluSurge model program. Estimates rely on FluSurge 2.0 Beta Test Software, created by the CDC. More information about the model is available at http://www.cdc.gov/flu/flusurge.htm.*

This scenario examines what would happen during a mild pandemic outbreak. The severity for this type of outbreak is based on the 1968 flu pandemic, which is considered relatively mild. The factors in the FluSurge model are set to assumptions based on the 1968 pandemic. These default settings assume an outbreak would be eight weeks in duration and 35 percent of the population would become ill. The data for the age demographics are from the Census Bureau's Current Population Survey, 2006, available at http://www.census.gov/. The bed statistics are based on the total number of licensed 2006 hospital beds (B) (which is available through Kaiser Family Foundation's State Health Facts, available at http://www.statehealthfacts.org/cgi-bin/healthfacts.cgi) and the typical hospital bed occupancy rates (R) (available for 2006 from CDC data and are available in the chart book, Health, United States, 2008). To determine the usual number of usual available beds, TFAH used the following formula – ((StatePop/1000) * B) * (1-R).

WAVES OF INFLUENZA AND THE IMPORTANCE OF VACCINES: 1957 PANDEMIC

In February 1957, the Asian influenza pandemic -- A/H2N2— was first identified in the Far East. In preparation, vaccine production began in late May 1957, and health officials increased surveillance for flu outbreaks. Vaccine was available in limited supply by August 1957. The virus first appeared in the United States in the summer of 1957 through a series of small outbreaks.[11]

The 1957 pandemic had three winter waves during the first five years. There were significant mortalities from the same influenza strain during the 1957/58, 1959/60, and 1962/63 winters.[12] The first wave accounted for 43 percent, the second for 28 percent, and the final wave, five years after the pandemic began, amounted to 29 percent of deaths.

The 1957 pandemic highlights the importance of a well-designed mass vaccination campaign and of remaining vigilant in preparedness efforts. In the present situation, vaccination manufacturers should continue to produce vaccines doses, and countries need to continue encouraging citizens to be vaccinated, even after it appears that the worst has passed. The World Health Organization (WHO) has discussed plans to incorporate H1N1 into seasonal flu vaccines next year as part of ongoing vigilance.

C. ANTIVIRALS

Two antiviral medications, Tamiflu® (oseltamivir) and Relenza® (zanamivir), have been shown to be generally effective for treating people with the H1N1 virus. There have been some cases where the antivirals may not have been effective, and there are some fears that the virus could become resistant to antivirals as the season progresses. In addition, there are reports that a new drug, Fludase®, may also prove to be effective against both the seasonal and H1N1 flu.

In September 2009, CDC issued guidelines suggesting antivirals should be reserved for patients with more severe cases of the flu or who are in a high-risk group for developing complications. In particular, experts emphasize the importance of its prudent use and being able to rapidly provide antivirals to individuals with underlying risks.

According to Flu.gov, "people with certain health conditions, such as asthma, diabetes, cancer, HIV/AIDS, and heart or kidney disease, may face special needs during flu season."

Currently in the United States:[13]

- 13.6 percent of adults have asthma;
- 8.3 percent of adults have diabetes;
- 4.2 percent of adults have had a heart attack;
- 4.3 percent of adults have been told they have coronary heart disease;
- 2.6 percent of adults have had a stroke;
- 27.8 percent of adults have high blood pressure;
- 18.4 percent of adults currently smoke;
- 13.1 percent of adults have chronic kidney disease;
- 5.9 percent of adults are "extremely" obese (BMI ≥ 40);
- 952,221 Americans aged 13 and older have AIDS; and
- 1,437,180 new cases of cancer were diagnosed in the past year.

During the past several years, the country has purchased a stockpile of antiviral medications to use during a flu pandemic. The medications have a shelf-life of seven years. National pandemic planning called for purchasing enough antivirals to be able to treat 25 percent of the U.S. population, or 75 million people. The current federal policy calls for the purchasing of antivirals to be a shared federal-state responsibility. The federal government has purchased 44 million treatment courses for the states, and set a requirement for state governments to purchase the remaining 31 million treatment courses in proportion to the population of their states with the federal government providing a subsidy for 25 percent of the cost. The federal government has another six million treatment courses in the stockpile for use in outbreak control. In the spring, CDC pushed out 25 percent of the federal stockpile to states. As of September 18, 2009, CDC's Strategic National Stockpile (SNS) contains approximately: 39.7 million regimens of oseltamivir capsules (Tamiflu), 9,279 regimens of oral suspension oseltamivir, and 10.3 million regimens of zanamivir (Relenza).

In addition to the antivirals received from the federal portion of the stockpile, according to HHS, as of September 10, 2009, state and local jurisdictions have stockpiled over 25 million treatment courses of antivirals, which is about five million short of the national goal. Twenty-four

states and D.C. have purchased 100 percent or more of their federally-subsidized antivirals; 30 states and D.C. have purchased 75 percent or more; 37 states and D.C have purchased 50 percent or more; and 44 states and D.C. have purchased 25 percent or more.

Combining the federal allocations received by states with states' purchases, 13 states do not currently have enough antivirals to cover 20 percent of their population: Arizona (16.1 percent); Colorado (14.9 percent); Connecticut (15.6 percent); Florida (17.6 percent); Idaho (15.5 percent); Massachusetts (17.7 percent); Montana (15.8 percent); Nebraska (19.0 percent); New Mexico (19.0 percent); Oklahoma (17.6 percent); Oregon (15.9 percent); Rhode Island (18.3 percent); and Utah (17.9 percent).

And another 11 states have only enough antivirals to cover between 20 and 25 percent of their population (combining their federal allocation and state purchases): Georgia (20.4 percent); Kentucky (20.2 percent); Maryland (24.7 percent); Minnesota (21.7 percent); Nevada (21.2 percent); New Hampshire (20.2 percent); North Carolina (23.0 percent); North Dakota (23.9 percent); Texas (23.2 percent); Washington (23.1 percent); and Wisconsin (21.5 percent).

This could present a problem if significant portions of people with underlying conditions that put people at risk, including asthma, diabetes, cancer, HIV/AIDS, and heart or kidney disease, become sick in states with limited antivirals available. Ensuring enough antivirals to care for at-risk patients is essential. Antiviral medications may also become needed if there is a third wave of H1N1, especially in the event the virus becomes more virulent over time as was the case with the 1957 pandemic. Currently, there is no system in place to ensure that either federal or state stockpiles of antivirals are replenished if used.

States that have not purchased their entire allotment of federally-subsidized antivirals have expressed concerns about different barriers, including funding, shelf-life of the drugs, antiviral resistance, and stockpile management. Funding for antiviral purchases has been a major barrier, even before the current economic recession and many states say they simply do not have the funds available. With deep budget cuts, states are reluctant to spend scarce resources on purchasing and stockpiling antivirals, particularly since they have a limited shelf-life (at the commencement of this program it was five years but was recently changed to seven years). In addition, according to the National Governor's Association (NGA) a number of states have "…expressed concerns about the reliance on antivirals given that their effectiveness in treatment may be compromised by the development of resistance by the pathogen."[14] States also have questioned the effectiveness of antivirals, particularly "…if they are used more than 48 hours after the onset of symptoms in an infected individual" and others have expressed concern over potential side effects.[15] So far, antiviral medications have proven to be effective for H1N1. Finally, states have questioned the management of antiviral stockpiles. A position statement from the Association of State and Territorial Health Officials (ASTHO) notes that "Efficient management of antiviral stockpiles is essential to reduce waste and ensure that maximum benefit is derived from this countermeasure."[16] As part of the efficient management of the states' antiviral stockpile, ASTHO recommends that states be given the ability to rotate stocks of antivirals purchased with the federal subsidy with stocks used for annual seasonal flu response. This way, the antivirals are more likely to be used before they reach their shelf-life expiration date. This will help preserve the states' investments in antivirals and limit the need to repurchase antivirals that have passed their expiration date.

Nationally, there are also many questions about the availability of medications suitable for children. As of November 2008, there were just over 3.8 million regimens of pediatric antiviral formulations in the federal stockpile to treat a potential pandemic flu for the nation's 73.6 million children.[17] The government has not set any target for stockpiling pediatric antivirals, even though children and adolescents are known to often be disproportionately affected by contagious respiratory illnesses, and have been especially affected by the current H1N1 outbreak.

Antivirals: Federal Stockpile Allocation for States and States' Purchases

State	Population	Federal Stockpile Allocation	Initial State Subsidy Allocation* (06/30/06)	All Antivirals Purchased by State (09/10/09)	Percent of Allocation Purchased	Percent of Population Covered by Antivirals
Alabama	4,503,726	671,156	472,860	533,553	112.8%	26.7%
Alaska	648,280	96,608	68,065	77,030	113.2%	26.8%
Arizona	5,579,222	831,429	585,780	67,717	11.6%	16.1%
Arkansas	2,727,774	406,500	286,397	382,398	133.5%	28.9%
California (including LA County)	25,591,206	5,284,740	3,723,339	3,809,362	102.3%	35.5%
Colorado	4,547,633	677,699	477,470	215	0.0%	14.9%
Connecticut	3,486,960	519,635	366,107	22,829	6.2%	15.6%
Delaware	818,166	121,925	85,902	180,095	209.7%	36.9%
District of Columbia	557,620	83,098	58,546	90,926	155.3%	31.2%
Florida	16,999,181	2,533,259	1,784,796	461,238	25.8%	17.6%
Georgia	8,676,460	1,292,987	910,968	474,022	52.0%	20.4%
Hawaii	1,248,755	186,093	131,111	172,487	131.6%	28.7%
Idaho	1,367,034	203,719	143,529	8,567	6.0%	15.5%
Illinois (including Chicago)	9,779,966	1,884,997	1,328,067	978,370	73.7%	29.3%
Indiana	6,199,571	923,875	650,912	650,912	100.0%	25.4%
Iowa	2,941,976	438,420	308,887	312,631	101.2%	25.5%
Kansas	2,724,786	406,054	286,084	286,084	100.0%	25.4%
Kentucky	4,118,189	613,703	432,381	216,224	50.0%	20.2%
Louisiana	4,493,665	669,657	471,804	478,734	101.5%	25.6%
Maine	1,309,205	195,101	137,457	164,659	119.8%	27.5%
Maryland	5,512,310	821,458	578,754	541,429	93.6%	24.7%
Massachusetts	6,420,357	956,777	674,093	179,862	26.7%	17.7%
Michigan	10,082,364	1,502,498	1,058,578	1,079,450	102.0%	25.6%
Minnesota	5,064,172	754,675	531,703	346,013	65.1%	21.7%
Mississippi	2,882,594	429,571	302,652	338,648	111.9%	26.7%
Missouri	5,719,204	852,290	600,477	600,477	100.0%	25.4%
Montana	918,157	136,826	96,400	8,174	8.5%	15.8%
Nebraska	1,737,475	258,923	182,423	71,952	39.4%	19.0%
Nevada	2,242,207	334,139	235,416	141,673	60.2%	21.2%
New Hampshire	1,288,705	192,046	135,305	68,000	50.3%	20.2%
New Jersey	8,642,412	1,287,913	907,393	880,293	97.0%	25.1%
New Mexico	1,878,562	279,948	197,236	77,409	39.2%	19.0%
New York (including NYC)	19,212,425	2,863,082	2,017,172	2,444,836	121.2%	27.6%
North Carolina	8,421,190	1,254,946	884,167	677,882	76.7%	23.0%
North Dakota	633,400	94,391	66,503	57,000	85.7%	23.9%
Ohio	11,437,680	1,704,471	1,200,877	1,388,858	115.7%	27.0%
Oklahoma	3,506,469	522,543	368,155	93,765	25.5%	17.6%
Oregon	3,564,330	531,165	374,230	36,668	9.8%	15.9%
Pennsylvania	12,370,761	1,843,521	1,298,844	1,313,517	101.1%	25.5%
Rhode Island	1,076,084	160,361	112,981	36,625	32.4%	18.3%
South Carolina	4,148,744	618,256	435,589	459,960	105.6%	26.0%
South Dakota	764,905	113,988	80,310	80,310	100.0%	25.4%
Tennessee	5,845,208	871,067	613,706	613,706	100.0%	25.4%
Texas	22,103,374	3,293,899	2,320,701	1,827,986	78.8%	23.2%
Utah	2,352,119	350,518	246,956	71,591	29.0%	17.9%
Vermont	619,343	92,296	65,027	71,036	109.2%	26.4%
Virginia	7,365,284	1,097,593	773,304	828,445	107.1%	26.2%
Washington	6,131,298	913,701	643,744	501,206	77.9%	23.1%
West Virginia	1,811,440	269,945	190,189	248,462	130.6%	28.6%
Wisconsin	5,474,290	815,792	574,763	363,729	63.3%	21.5%
Wyoming	502,111	74,826	52,718	74,826	141.9%	29.8%
Total:	**278,048,349**	**43,334,080**	**30,530,828**	**24,891,841**	**81.5%**	**24.5%**

Source: http://www.pandemicflu.gov/plan/states/antivirals.html (accessed September 23, 2009).

* "Initial allocation" is for subsidized treatment courses only; 25% federal subsidy per treatment course. Many states have purchased additional antivirals at unsubsidized prices.

D. OTHER MEDICAL EQUIPMENT AND THE STRATEGIC NATIONAL STOCKPILE

The Strategic National Stockpile (SNS) consists of medicine and medical supplies to provide support during public health emergencies when state and local resources are overwhelmed and exhausted. Each state has plans to quickly receive and distribute SNS medicine and medical supplies to local communities.[18] A 2008 U.S. government review of state pandemic plans, found that 34 states and D.C. were adequately prepared to acquire and distribute medical countermeasures during a pandemic, including: Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Illinois, Indiana, Iowa, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Jersey, New Mexico, New York, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, South Dakota, Texas, Vermont, Virginia, Washington, and Wisconsin.[19]

The federal portion of the flu antiviral medication stockpile is part of the SNS. The SNS also contains back up stores of equipment, such as ventilators, personal protective equipment such as N-95 respirator masks, syringes, sterile gloves and other life-saving medical materiel.

With the H1N1 outbreak, the availability of medical equipment is likely to be limited, and states may seek help from the SNS to meet their needs. The quantity of non-pharmaceutical interventions for pandemic influenza in the SNS, such as N-95 respirator masks and surgical masks, falls far short of what may be needed. As of the spring of 2009, the U.S. stockpile contained 105.8 million N-95 respirators and 51.7 million surgical masks.[20] CDC reports that 25 million N-95 respirator masks were distributed from the SNS during the spring, reducing the nationally-available number of N-95s to 79.7 million. The SNS also contains 37.7 million surgical masks, which are not considered effective protection against H1N1. This is short of the number that many experts believe would be adequate, but no action has been taken to replenish this supply and there are some questions if additional respirator masks are available due to limited availability.

E. TRACKING THE DISEASE

Surveillance issues are also a major concern. The flu has traditionally been tracked through a surveillance system through a partnership among CDC, state, and local health departments, public health and private clinical laboratories, vital statistics offices, health care providers, clinics, and emergency departments. The system offers output measures including number of outpatient consultations for influenza-like illnesses, hospitalization rates for influenza, pediatric deaths from influenza, population-wide deaths from pneumonia and influenza, and virus characteristics.[21] However, the system does not report data in real time, which is particularly important for tracking a major outbreak to identify clusters where the outbreak is heaviest or to monitor the severity of the virus to see if it might be getting more dangerous.

Prior to the onset of H1N1, CDC's National Influenza Surveillance System consisted of nine systems to monitor flu viruses and follow the flu's geographic spread. In response to the rapid spread of H1N1, CDC and the states implemented line-listing reporting for cases of H1N1 beginning in April 2009.[22] As cases continued to grow, the system was adapted to include total counts of H1N1 cases, hospitalizations, and deaths. By August, the updated surveillance system transitioned to include only hospitalizations and deaths, rather than reporting all probable and confirmed cases of H1N1.

In order to respond to the pandemic, the President's Council of Advisors on Science and Technology (PCAST) developed six surveillance questions that must be asked in order for federal decision makers to have the data necessary to make informed policies and recommendations:[23]

1. About how many people are becoming infected, getting sick, seeking medical care, being hospitalized, requiring intensive care, and dying from H1N1?
2. How are the numbers changing over time?
3. Who is at greatest risk of becoming infected and most susceptible to severe outcomes?
4. How is the virus changing?
5. Are the medical and public health systems able to respond adequately?
6. How well do medical and public health responses work?

To respond quickly and appropriately to the fall resurgence of H1N1 there must be an even more efficient and all-encompassing surveillance system in place to track the numbers of people in-

fected, seeking medical treatment, being hospitalized, and dying. The recently released PCAST report outlines an ambitious surveillance system that upgrades the current national surveillance systems in time for fall 2009 by integrating and expanding existing systems.

Carrying out the PCAST recommendations will require significant time and resources. Some experts question whether there are sufficient resources to improve the system on such a short timetable. Also, it is important to consider whether the PCAST recommendations are a one-time emergency system to respond to H1N1, or whether this will change the surveillance system for future outbreaks.

II. VACCINE ISSUES

Vaccination is the best defense against an infectious disease epidemic, but in order to maximize its utility, implementation must be timely and cover the most at-risk segments of the population.

After the initial H1N1 outbreak, the United States immediately started preparing for H1N1 vaccinations. In mid-September, the U.S. FDA cleared vaccines from CSL Limited, MedImmune LLC, Novartis Vaccines and Diagnostics Limited, and sanofi pasteur Inc to help prevent H1N1. The U.S. FDA approved the vaccine more rapidly than the European consortium. CDC has reported that somewhere between 45 million and 52 million doses should be available by mid-October and to be followed by weekly installments of vaccine totaling about 195 million doses by the end of the year.[24] Vaccinations are starting immediately in some other countries, with many other nations planning to begin immunization efforts in October.[25]

Once the vaccine begins to be available, the U.S. strategy is to heavily target at-risk individuals and then as the vaccine is more widely available, to offer it to all Americans. CDC does not anticipate any vaccine shortages.

Based on what is currently known about the H1N1 virus, the federal Advisory Committee on Immunization Practices (ACIP) issued a list of priority groups for the H1N1 vaccine including:

- Pregnant women;
- Household contacts and caregivers for children younger than six months of age;
- Health care and emergency medical services personnel;
- All people from six months through 24 years of age; and
- Persons aged 25 through 64 years who have health conditions associated with higher risk of medical complications from influenza.[26]

Every state has created a vaccination plan, which includes identifying locations where the public will be directed to receive vaccinations. These locations will vary by state and may include health care providers, community health centers, and pharmacies, and/or state and local health departments may set up special vaccination centers in places like shopping malls or even drive-thru stations. States are providing CDC with vaccine ordering information, and CDC has contracted with the McKesson Corporation to distribute vaccine directly to approximately 90,000 locations the states have identified. The vaccines will be distributed along with ancillary equipment items like syringes and sterilization swabs in accordance with state plans.

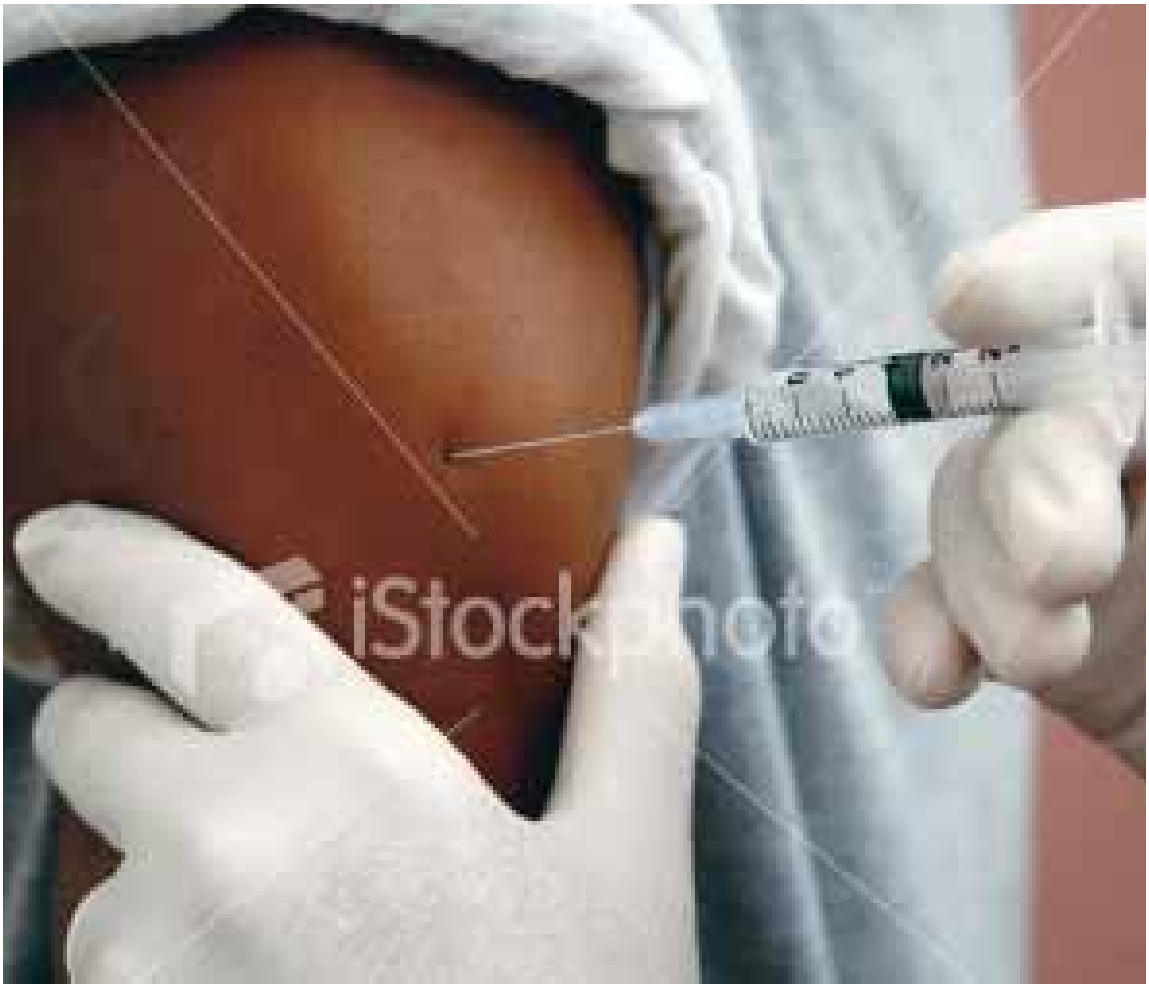
The states' mass vaccination plans also include plans for how to transport vaccines safely, re-distribute vaccines if some locations require more or fewer supplies than planned, track vaccinations, and monitor potential adverse effects that people may have to the vaccine. In 2008, HHS conducted a review of state pandemic plans and found that 29 states and D.C. were adequately prepared to meet mass vaccination capabilities based on their plans, including Alabama, Arkansas, California, Connecticut, Delaware, D.C., Georgia, Hawaii, Idaho, Illinois, Kansas, Louisiana, Maine, Massachusetts, Mississippi, Nevada, New Hampshire, North Carolina, North Dakota, Oklahoma, Oregon, Rhode Island, South Carolina, Tennessee, Texas, Utah, Vermont, Virginia, Washington, and Wisconsin.[27] The additional states were determined to have some gaps in preparations.

A. CHALLENGES FOR MASS VACCINATIONS

Vaccinating millions of Americans presents a series of challenges. Traditionally, the United States does not have strong mechanisms in place for providing mass vaccinations.

The annual vaccine for seasonal flu is the largest existing program for adult vaccinations in the United States. However, only a fraction of adults receive this vaccine. In some states, the rates of adult vaccinations for the flu is as low as 25.5 percent (Nevada), and even the state with the highest vaccination rate, 49.2 percent in South Dakota, is less than half of the state's population. Seasonal flu shots have been largely recommended for seniors above the age of 65, since they are most at risk for health complications related to the flu. Even with targeted efforts to vaccinate seniors, the rates of annual flu vaccinations for seniors is as low as 61.3 percent in D.C. and no state exceeds 80 percent. The highest rate is 78.1 percent in New Hampshire.

Unlike the typical seasonal flu, the H1N1 virus is proving to be more dangerous for young adults than it is for seniors. Historically, very low rates of young adults get an annual flu shot, the rate is 24.1 percent for 18 to 49 year olds. The rate for this age group is highest in South Dakota at 37.8 percent and is as low as 15.4 percent in Nevada. This means the group that will be most at risk for more severe cases H1N1 is less informed and the least accustomed to getting vaccinations. One reason for the low vaccination rates for young adults is that individuals between 19 and 29 years old represent one of the largest and fastest growing segments of the population without health insurance and often do not have a regular doctor or do not seek regularized or preventive care.[28] Reasons for being uninsured include that many low-income young adults are ineligible for public programs, move between schools and jobs, have shorter job tenure, and work at entry-level temporary jobs that do not provide health insurance.



SEASONAL FLU VACCINATION RATES FOR ADULTS, 2008				
State	**18-49 Year Olds**	**50-64 Year Olds**	**65 Years and Over**	**Total**
Alabama	26.3% (+/- 2.8)	41.8% (+/- 2.8)	68.7% (+/- 2.7)	37.9% (+/- 1.9)
Alaska	26.7% (+/- 3.5)	43.0% (+/- 4.9)	68.5% (+/- 6.3)	35.2% (+/- 2.8)
Arizona	22.2% (+/- 3.6)	39.4% (+/- 4.6)	71.4% (+/- 3.2)	34.8% (+/- 2.6)
Arkansas	27.7% (+/- 2.7)	44.9% (+/- 2.8)	70.5% (+/- 2.5)	40.1% (+/- 1.8)
California	18.4% (+/- 1.5)	39.5% (+/- 2.2)	70.0% (+/- 2.2)	30.8% (+/- 1.1)
Colorado	28.9% (+/- 1.6)	48.6% (+/- 1.9)	77.9% (+/- 1.7)	40.4% (+/- 1.2)
Connecticut	28.3% (+/- 2.6)	45.7% (+/- 3.0)	74.6% (+/- 2.4)	41.1% (+/- 1.8)
Delaware	26.1% (+/- 3.0)	46.7% (+/- 3.9)	69.6% (+/- 3.5)	38.8% (+/- 2.2)
D.C.	30.3% (+/- 2.8)	44.2% (+/- 3.3)	61.3% (+/- 3.5)	38.2% (+/- 2.0)
Florida	17.7% (+/- 2.5)	32.4% (+/- 2.8)	63.5% (+/- 2.5)	31.4% (+/- 1.7)
Georgia	21.8% (+/- 2.3)	38.6% (+/- 2.8)	65.2% (+/- 2.9)	31.8% (+/- 1.7)
Hawaii	31.9% (+/- 2.5)	47.4% (+/- 2.8)	77.1% (+/- 2.5)	44.2% (+/- 1.7)
Idaho	20.8% (+/- 2.3)	39.5% (+/- 2.8)	68.4% (+/- 2.9)	33.0% (+/- 1.7)
Illinois	20.8% (+/- 2.2)	38.6% (+/- 3.0)	63.2% (+/- 2.9)	31.9% (+/- 1.7)
Indiana	21.5% (+/- 2.6)	39.9% (+/- 3.1)	68.6% (+/- 3.1)	34.1% (+/- 1.9)
Iowa	32.7% (+/- 2.4)	48.2% (+/- 2.7)	76.5% (+/- 2.2)	44.8% (+/- 1.7)
Kansas	26.9% (+/- 2.0)	43.5% (+/- 2.1)	72.0% (+/- 1.9)	38.9% (+/- 1.4)
Kentucky	25.8% (+/-2.5)	43.6% (+/- 2.6)	73.6% (+/- 2.3)	38.6% (+/- 1.7)
Louisiana	27.5% (+/- 2.3)	43.6% (+/- 2.6)	68.0% (+/- 2.8)	38.2% (+/- 1.6)
Maine	25.0% (+/- 2.1)	47.3% (+/- 2.3)	74.6% (+/- 2.2)	40.6% (+/- 1.5)
Maryland	26.8% (+/- 2.0)	46.3% (+/- 2.4)	69.8% (+/- 2.5)	38.5% (+/- 1.4)
Massachusetts	28.5% (+/- 1.6)	45.8% (+/- 1.8)	72.0% (+/- 1.7)	40.5% (+/- 1.1)
Michigan	23.0% (+/- 1.8)	41.8% (+/- 2.1)	70.0% (+/- 2.0)	35.7% (+/- 1.3)
Minnesota	36.8% (+/- 2.9)	50.4% (+/- 2.9)	76.4% (+/- 2.6)	46.6% (+/- 2.0)
Mississippi	24.7% (+/- 2.2)	38.4% (+/- 2.3)	67.5% (+/- 2.2)	35.5% (+/- 1.5)
Missouri	26.5% (+/- 2.8)	45.1% (+/- 3.3)	71.3% (+/- 2.8)	39.2% (+/- 2.0)
Montana	25.3% (+/- 2.6)	40.9% (+/- 2.5)	69.3% (+/- 2.4)	37.8% (+/- 1.7)
Nebraska	33.0% (+/- 2.4)	51.3% (+/- 2.3)	75.7% (+/- 1.8)	45.2% (+/- 1.6)
Nevada	15.4% (+/- 2.3)	29.6% (+/- 3.5)	57.1% (+/- 3.9)	25.5% (+/- 1.8)
New Hampshire	28.9% (+/- 2.2)	49.4% (+/- 2.5)	78.1% (+/- 2.1)	42.6% (+/- 1.6)
New Jersey	22.9% (+/- 1.9)	39.9% (+/- 2.2)	65.9% (+/- 2.2)	34.8% (+/- 1.3)
New Mexico	28.0% (+/- 2.6)	42.3% (+/- 2.8)	69.7% (+/- 2.6)	38.6% (+/- 1.8)
New York	24.8% (+/- 2.1)	43.9% (+/- 2.6)	70.9% (+/- 2.4)	37.6% (+/- 1.5)
North Carolina	28.4% (+/- 1.7)	47.3% (+/- 1.9)	73.0% (+/- 1.6)	40.4% (+/- 1.2)
North Dakota	30.0% (+/- 2.8)	45.4% (+/- 2.7)	73.2% (+/- 2.4)	42.1% (+/- 1.9)
Ohio	24.2% (+/- 1.9)	42.0% (+/- 2.0)	70.3% (+/- 1.8)	37.1% (+/- 1.3)
Oklahoma	27.8% (+/- 2.0)	51.3% (+/- 2.4)	73.2% (+/- 2.1)	41.8% (+/- 1.4)
Oregon	20.7% (+/- 2.3)	43.2% (+/- 2.7)	70.1% (+/- 2.6)	35.3% (+/- 1.7)
Pennsylvania	23.7% (+/- 2.0)	43.2% (+/- 2.3)	71.7% (+/- 2.0)	38.3% (+/- 1.4)
Rhode Island	28.1% (+/- 2.8)	49.9% (+/- 3.0)	74.0% (+/- 2.6)	42.0% (+/- 2.0)
South Carolina	23.6% (+/- 2.3)	42.9% (+/- 2.7)	68.0% (+/- 2.4)	36.3% (+/- 1.6)
South Dakota	37.8% (+/- 2.7)	53.6% (+/- 2.6)	76.3% (+/- 2.1)	49.2% (+/- 1.8)
Tennessee	29.0% (+/- 3.2)	42.7% (+/- 3.1)	70.8% (+/- 2.8)	39.5% (+/- 2.1)
Texas	24.8% (+/- 1.9)	42.1% (+/- 2.5)	71.1% (+/- 2.2)	35.4% (+/- 1.5)
Utah	30.7% (+/- 2.4)	48.6% (+/- 3.2)	73.3% (+/- 3.0)	39.8% (+/- 1.8)
Vermont	26.1% (+/- 2.1)	46.9% (+/- 2.2)	73.4% (+/- 2.2)	40.2% (+/- 1.5)
Virginia	29.3% (+/- 3.3)	48.0% (+/- 3.6)	73.1% (+/- 3.1)	40.7% (+/- 2.4)
Washington	26.3% (+/- 1.3)	44.2% (+/- 1.4)	71.4% (+/- 1.4)	38.0% (+/- 0.9)
West Virginia	23.5% (+/- 2.4)	46.5% (+/- 2.9)	71.1% (+/- 2.8)	39.1% (+/- 1.8)
Wisconsin	28.9% (+/- 2.8)	44.4% (+/- 3.2)	73.0% (+/- 3.0)	40.5% (+/- 2.0)
Wyoming	27.7% (+/- 2.0)	44.8% (+/- 2.1)	70.7% (+/- 2.1)	39.5% (+/- 1.4)
National Totals	**24.1% (+/- 0.5)**	**42.0% (+/- 0.5)**	**69.5% (+/- 0.5)**	**36.1% (+/- 0.7)**

Source: Behavioral Risk Factor Surveillance System. For more information on the methodology, see Appendix A.

Also, experts believe children may be at increased risk for contracting H1N1. Typically, children receive some required vaccinations before starting school through their health care provider or sometimes through public health departments, but few children regularly get flu shots, which are available later in the fall and are not required for school entry. Officials around the country are exploring ways to quickly try to reach children when an H1N1 vaccine becomes widely available, including the possibility of making vaccines available through schools. U.S. Secretary of Education Arne Duncan believes "to open our doors [at schools] and be part of the solution really makes sense."[29] In fact, hundreds of schools across the country are participating in what could be the most widespread vaccination effort since polio.[30] A survey by the National School Boards Association found that approximately three-quarters of school districts plan to allow vaccinations to be distributed in school buildings.[31] In New York City, all primary school aged children will be offered both the H1N1 and seasonal flu vaccination at no cost.[32]

MONITORING VACCINE SAFETY

As with any immunization or medication, receiving a flu shot has the potential to cause various side effects. Generally, reported side effects for influenza vaccines include post vaccination fever, soreness at the vaccination site, runny nose, headache, vomiting, and abdominal pain. The symptoms are typically mild, and rarely interfere with the recipient's daily routine.[33]

HHS created the Vaccine Adverse Event Reporting System (VAERS). VAERS is a cooperative program for vaccine safety between CDC and FDA. The system collects information about adverse events and possible side effects that occur after the administration of U.S. vaccines.

Vaccines and Payment Issues

The hybrid public-private vaccine delivery system in the United States makes the distribution and administration of vaccines complicated. The health insurance system is comprised of thousands of separate coverage arrangements governed by multiple laws that lack common content or coverage and payment requirements. Some issues presented by this system, in the context of H1N1 mass vaccination include:

- The federal government will pay for the actual vaccine, but not the administration of the vaccine. Instead, the federal government will work with states and localities to determine how and where to distribute the shots effectively.
- The shots will be made available in varied ways in every state and locality in the country based on the plans that each state has in place to best meet local need.
- Vaccinations will be available through a number of different places, including through doctors' offices, through public health department distribution locations, and likely through private pharmacies in stores.
- Payment methods for the administration of the vaccines could vary depending on where a person gets a shot.
- Some insurance companies will cover administration of the shots, while others may not.
- If a person gets a vaccination through a public health department mass vaccination location or through a private pharmacy, the payment for the administration of the shot may be covered by the government in some places or the state may charge people for their shot or the state may try to bill the person's insurance, depending on the state's plan.
  - There are no systematic policies for assuring third party reimbursement for administration of vaccines in emergency situations, even when an individual has insurance. Some private insurance companies have voluntarily indicated they will pay, but how broad that coverage will be remains to be determined. America's Health Insurance Plans (AHIP) has stated that, "Every year health plans contribute to the seasonal flu vaccination campaign in several ways: a) Health plans communicate directly with plan sponsors and members on the current ACIP recommendations and encourage immunization; they also provide information on where to get vaccinations, and who to contact with any questions. b) Just as health plans have provided extensive coverage for the administration of seasonal flu vaccines in the past, public health planners can make the assumption that health plans will provide reimbursement for the administration of a

novel (A) H1N1 vaccine to their members by private sector providers in both traditional settings e.g., doctor's office, ambulatory clinics, health care facilities, and in non-traditional settings, ***where contracts with insurers have been established."*** [sic.][34]

- ▲ According to CDC, providers may charge patients if they are uninsured. The administration fee cannot exceed the regional Medicare vaccine administration fee. However, there will be no administration fee for vaccination in public-health organized large scale vaccination clinics.[35]
- ▲ Medicare will reimburse for their beneficiaries. Medicaid coverage is determined by the states, and, according to the U.S. Government Accountability Office (GAO), in four states, Medicaid does not even cover regular flu vaccinations for adults.[36]

- For the uninsured or in places where individuals are expected to pay for shots, the cost may deter many individuals from seeking vaccines. One in seven Americans lack health insurance.[37] The Seasonal Influenza and Pandemic Preparation Act of 2009, introduced by Sen. Tom Harkin in May, would establish a nationwide voluntary influenza vaccination program under which any individual may receive an annual influenza vaccine, free of charge.[38]

Three major insurance issues surround H1N1 immunizations. These issues may create barriers that deter low-income families and individuals from seeking immunizations. The concerns include:

- Determining whether an insurance provider will require a co-pay or deductable for receiving an H1N1 immunization;
- Making it easy for providers to bulk bill insurance companies or government insurance providers for payment though a method called roster billing, instead of filling out individual paperwork claims for every single patient; and
- Allowing for out-of-network coverage, so that patients can go to available locations administering vaccines without concern for whether they are part of their official insurance network.

The federal government has direct oversight responsibilities for certain health insurance arrangements and can set policies for these programs, including Medicare, Medicaid, and the Children's Health Insurance Program (CHIP). In addition, the federal government plays a key oversight role in the case of health benefit plans covering the federal civilian and military workforce (Office of Personnel Management (OPM) and the U.S. Department of Defense (DOD)). HHS and the U.S. Department of Labor (DOL) also oversee the state regulated insurance market for both small group and individual coverage as a result of the Health Insurance Portability and Accountability Act (HIPAA). Finally, DOL oversees the administration of health benefit plans offered by private employers. As of 2009, around 60 percent of private employers sponsored health benefit plans for their employees.[39] Virtually all of these plans operate under the authority of the Employee Retirement Income Security Act (ERISA). Finally, the Internal Revenue Service (IRS) oversees the awarding to tax-free status to the 2,900 non-governmental, nonprofit hospitals in the United States, which includes requiring these hospitals meet defined "community benefit" standards.

Sara Rosenbaum, JD, Chair of the Department of Health Policy at The George Washington University School of Public Health and Health Services, conducted an analysis for TFAH to determine what actions federal agencies could take to help improve vaccine administration issues, which found that as of mid-September:

- Medicare has updated and clarified their policies to make sure the administration of shots are covered for their beneficiaries at no cost, including no deductibles or coinsurance payments, and to permit roster billing. Medicare has not clarified their policies around out-of-network coverage for beneficiaries or Medicare Advantage patients.[40]
- Medicaid should update their policies around co-pays, roster billing, or out-of-network issues. They should clarify that their polices should provide coverage for administration of the vaccine and out-of-network medical care related to H1N1 and allow for roster billing. The program covers 60 million individuals including the nation's most vulnerable low-income and medically high-risk individuals. H1N1 vaccine administration is covered for children enrolled in Medicaid through the early and periodic screening, diagnostic and treatment benefit (EPSDT).
- DOL has the ability to communicate with ERISA-governed health benefit plans offered by private employers to encourage them to provide information to all of their beneficiaries about the importance of getting vaccinated; waive co-pay requirements for vaccinations; and waive out-of-network restrictions for vaccinations; and provide state and local public health departments with information about vaccination rates and progress to the extent covered by law (ERISA does not pre-empt public health reporting requirements).

- OPM and DOD can also communicate with the contractors that manage their health plans to encourage that they provide information to all of their beneficiaries about the importance of getting vaccinated; waive co-pay requirements for vaccinations; and waive out-of-network restrictions for vaccinations; and provide state and local public health departments with information about vaccination rates and progress to the extent covered by law.
- The U.S. Treasury Department, of which the IRS is one of the divisions, could remind nonprofit hospitals that immunization is a key community benefit and encourage that they actively work to provide vaccines to the community and extend hours and their workforce to help state and local health departments with community vaccination efforts. The IRS found has found that in the past, nearly one in two nonprofit hospitals spent nothing on immunizations, and for those who did, many may have charged for the care.[41]

Another challenge is that many individuals may need two vaccines during the upcoming flu season, one for the seasonal flu and one for H1N1.[42] Health officials have expressed concerns that many individuals could become confused and only try to get one of the two shots, or that some individuals who are at high risk for seasonal flu may put off getting their seasonal flu shot until both shots are available and they can try to get the shots at the same time.

Health officials advise that people should get their seasonal flu shot as soon as possible, and then get an H1N1 shot as soon as they can once it is available.

In order to get as many people vaccinated as possible, CDC has recommended extending the traditional flu vaccination period, normally October through January, to September through May.[43]

UPGRADING FLU VACCINE DEVELOPMENT AND PRODUCTION IN THE UNITED STATES

In an effort to increase the availability of vaccines for infectious diseases and potential bioterrorism threats, Congress created the Biomedical Advanced Research and Development Authority (BARDA). BARDA awarded a $487 million multiple year contract in January 2009 to Novartis Vaccines and Diagnostics, Inc. to build the first United States facility to manufacture cell-based vaccine for seasonal and pandemic influenza.[44]

GLOBAL DISPARITIES OF VACCINES

The manufacturing capacity for influenza vaccines is very large globally, yet even if all companies worked on producing only a vaccine for H1N1 there would still not be enough for everyone in the world.[45]

During a global health crisis it is imperative that all countries, rich or poor, have equal access to vaccines. For the H1N1 vaccine, three major manufacturers -- GlaxoSmithKline, Sanofi-Aventis, and Novartis -- have all indicated the possibility of offering tiered pricing, as well as donating up to 100 million doses to a stockpile for poor countries.[46] In addition, the United States has announced that it will donate 10 percent of its H1N1 vaccine supply to the World Health Organization for use in low-income countries. The other countries making donations are Australia, Brazil, Britain, France, Italy, New Zealand, Norway and Switzerland.[47]

Poor countries face issues with acquiring adequate amounts of vaccines, but fortunately they have an advantage in mass distributions. Many poor countries have had recent experience with mass vaccinations against diseases such as polio, measles, and hepatitis B.[48]

Wealthy countries, manufacturers, and regulatory agencies all have a responsibility to continue to make sure vaccinations are distributed quickly and fairly to all countries.

IV. BUDGET CUTS AND HEALTH DEPARTMENT WORKFORCE SHORTAGES

Public health departments around the country are understaffed and underfunded, which makes it challenging to carry out pandemic plans. The current economic crisis makes the problem even worse, as many state and local health departments are facing budget cuts.

Historically, funding for public health emergency preparedness has focused on responding to the crisis of the moment. This has lead to a pattern where new funds are appropriated to respond to a new threat, but these funds are typically a one-time allocation or erode over time, and do not address many of the underlying problems in the system.

After September 11, 2001 and the anthrax attacks, Congress made a major investment aimed at upgrading America's public health system. However, the funding was only a fraction of what would be needed to truly modernize public health systems across the country. Over the years, this funding for state and local public health preparedness has eroded. In FY 2009, funding for state and local public health preparedness was down 25 percent from FY 2005 levels. Although the current Administration proposed restoring $15 million in state and local preparedness dollars in the FY2010 budget, that does not undo the damage the cuts in previous years had on public health preparedness.

During the spring outbreak, the capacity of health departments to track, investigate, and contain cases of H1N1 was pushed to the limit due to lack of resources. In addition to the 25 percent cut of federal funds to support state and local preparedness from FY 2005 to FY2009, 48 states are experiencing shortfalls in their budgets for FY 2010. The shortfalls total $168 billion, which is one-quarter of state budgets, according to the Center on Budget and Policy Priorities.[49] Public health funding is typically discretionary spending in states and therefore, often experiences significant cuts during economic downturns. While few states allocate funds directly for public health preparedness, state and local funding is essential for supporting public health infrastructure and core capacities of health departments.

Health departments around the country are also facing severe workforce shortages. Around one-fourth of public health workers are eligible for retirement.[50] That problem is worsening as state and local governments cut their budgets. The National Association of County and City Health Officials (NACCHO) found that local health departments eliminated 8,000 staff positions in the first half of 2009, which adds to the 7,000 local public health jobs lost in 2008.[51] According to NACCHO, local health department staffing levels this coming fall and winter are less than they were this past spring, even though demands are greater as the H1N1 outbreak is expected to be much more widespread. The Association of State and Territorial Health Officials (ASTHO) reports similar problems at state health departments.

States are further hampered by current restrictions which do not allow employees who are supported by federal dollars to be reassigned or "loaned" from their categorically defined and funded programs to help with the H1N1 response at the discretion of local health departments. For instance, without new direction from the federal government, an employee supported by federal dollars in the environmental health division may not be temporarily reassigned to work on the H1N1 response. CDC has recently issued guidance to states to allow for greater flexibility on the use of categorical funds and assets to respond to H1N1, but other federal agencies, including the Substance Abuse and Mental Health Services Administration (SAMSHA), the Health Resources and Services Administration (HRSA), and the Women, Infants, and Children (WIC) Program, have not.

STAFFORD DISASTER RELIEF AND EMERGENCY ASSISTANCE ACT

The Stafford Act is a federal law that provides statutory authority for a Presidential declaration of an emergency or a declaration of a major disaster.[52] The Act helps quickly disperse federal funds to state and local governments, families, individuals, and certain nonprofit organizations. Actions the Act authorizes include setting up temporary housing, dispersing grants for immediate needs of families and individuals, the repair of public infrastructure, and organizing emergency communications systems.

Generally, in order for assistance to be granted, the President must receive a request from the Governor of an affected state, unless the incident involves primarily Federal interests. When considering whether to grant relief for the request the President evaluates a number of factors, including the cause of the catastrophe, damages, needs, certification by state officials that state and local governments will comply with cost sharing and other requirements, and official requests for assistance. The Federal Emergency Management Agency (FEMA) has established thresholds which are evaluated by the President and Department of Homeland Security (DHS) officials in determining whether to declare a disaster or emergency.

By way of executive orders, the President has delegated the responsibility of administering the provisions of the Stafford act to FEMA.[53] Funding for the Stafford Act is appropriated to the Disaster Relief Fund (DRF), which is overseen by DHS. Money in the DRF is a "no-year" appropriation and remains in the fund until it is used in full.

The Stafford Act authorities were designed to address localized natural disasters. Some experts suggest revisions may be needed to facilitate appropriate federal support in response to an emergency, such as a pandemic.

V. PREPAREDNESS IN COMMUNITIES

Clear, consistent, culturally-competent communication with the public is essential during a disease outbreak so that health departments and providers can let people know about latest developments, how to best protect themselves, when they should limit their public activities and avoid going to work or school, and when and where they should go for medications or vaccinations. This includes letting people know the prioritization plans for vaccinations when limited amounts of vaccine may be available or when it is more important to vaccinate a target population in advance of the rest of a community.

Health officials will rely on communicating the importance of non-pharmaceutical interventions (NPIs) to reduce people's exposure to the virus. As noted by GAO, some health officials hope that spreading out the number of people who become ill at any given time, "can help the health care system by reducing the anticipated influx of patients by limiting the rate of disease transmission."[54]

Types of Non-Pharmaceutical Interventions

Type of NPI	Definition
Isolation	The separation or restriction of movement of individuals ill with an infectious disease to prevent transmission to others.
Quarantine	The separation or restriction of movement of individuals exposed to an infectious disease, but not yet ill, who may become infectious to others.
Social distancing	Measures taken to decrease the frequency of contact among people, such as the closing of schools, shopping malls, or movie theaters, or the cancellation of large public events.
Infection control	Hygiene measures to reduce the risk of transmission from infected individuals to uninfected individuals, including hand washing, cough etiquette, use of masks, and disinfection.

Source: CDC

Sick Leave

One proven non-pharmaceutical intervention to slow or curb the spread of a pandemic is to stay home if you are sick, or keep your child home if they are sick. At a news conference in late April President Obama emphasized this: "If you are sick, stay home. If your child is sick, keep them out of school."[55]

This advice presents special challenges for the nearly half of American workers in the private sector who do not have any paid sick leave available. This amounts to more than 59 million people.[56] This statistic also disproportionately includes women, low-wage, and part-time workers.

In an already unstable economic situation, individuals who are sick and should stay home may still go to work for fear of lost wages or losing their job. According to Debra L. Ness, the president of the National Partnership for Women and Families, "This could be the beginning of a spiral into economic disaster. People can't just cavalierly put their jobs or paychecks at risk."[57]

This could mean that restaurants, child care centers, nursing homes, hotels, public transit systems, schools, and offices across the country could be operated and run by individuals infected with the flu who should be at home, not at work.[58] In addition to lacking personal sick leave, another 100 million workers do not have sick leave that enables them to take time off to care for an ill child, spouse, or parent.

In new guidance issued on August 19, 2009, CDC recommends actions businesses should take to decrease the spread of influenza in the workplace during the 2009 flu season.[59] One recommendation is to keep sick workers home and not let them return to work until 24 hours after their fever is gone. The guidance stresses the importance of allowing sick workers to stay home without fear of losing their job.

Draft guidance by the U.S. Office of Personnel Management (OPM) suggests that the government may extend new leave policies to federal employees providing care to family members with the H1N1 flu.[60] Federal employees would be able to use accrued or accumulated sick leave to stay home to care for a family member if a doctor or other health official determines that their presence in the workplace might jeopardize the health of co-workers and to use advanced sick leave if they have exhausted their annual allotment. The proposal is not likely to go into effect until well into the H1N1 outbreak, however, and the proposed rules would not affect government contractors, who often do not have any sick leave available.

A. CHILDREN'S ISSUES

How to treat and care for the nation's 73.6 million children and adolescents during an influenza pandemic raises unique concerns.[61] An estimated 67 million of these children and youth are in schools or childcare facilities at any given point during the week.[62] With so many children spending a large percentage of their time at school it is important to consider what will happen in the fall and winter of the H1N1 pandemic.

Children are not "small adults" and special consideration needs to be given to complicated issues ranging from child-appropriate doses of medications and vaccines to caring for children if schools and childcare facilities are closed for extended periods. Parents and other caregivers may also become sick during a pandemic, complicating their ability to care for children.

Children are at disproportionate risk for spreading virus (and have been disproportionately affected by H1N1 so far). According to findings reported by CDC, children ages five to 14 became ill with H1N1 at a rate of 147 per 100,000 people in Chicago from April to July— a rate 14 times higher than that of the elderly.[63]

Public health experts agree that children infected with influenza are major transmitters of the disease. Children gather in groups – in school, in childcare settings, on playgrounds, in households, and elsewhere – and often are careless when it comes to their personal hygiene. They cough and sneeze, not always taking care to do so into a tissue, or into their sleeves, which many pediatricians consider the next best alternative. Instead, they cough into their hands, and then touch other objects – a door knob, a computer mouse or keyboard, toys – or other people, including other children. Moreover, it is challenging to try to teach very young children "cough etiquette," or to get them to wash their hands frequently.

Three federal agencies (HHS, Department of Homeland Security, Department of Education), and Sesame Workshop, the nonprofit educational organization behind the television show Sesame Street, have gotten together to launch a public service advertising (PSA) campaign. The PSA uses Sesame Street's Elmo and Gordon to encourage children and families to practice healthy habits including washing hands, sneezing into the bend of your arm, and avoiding contact with your eyes, nose and mouth to minimize the spread of H1N1. The PSAs can be found at www.flu.gov and will also be distributed nationwide and aired on airtime donated by television stations.[64]

Vaccinating Young Children

Currently, ACIP recommends that all children aged six months to 18 years should be vaccinated against the flu every year. In 2004, ACIP expanded the age range for routine vaccination to include children aged six to 23 months, and finally in 2006, they further expanded the recommendation to include all children aged 24 to 59 months.[65]

CDC explains the expansion to a greater number of children because of the following:

- Growing evidence that the flu vaccine is effective and safe for children;
- Accumulated evidence that the flu has substantial adverse impacts among children and their contacts such as school absenteeism, increased antibiotic use, medical care visits, and parental work loss; and
- The expectation that an age-based flu vaccine recommendation for all children and adolescents will improve vaccination rates among children who already should be receiving the vaccination due to another factor putting them at heightened risk.[66]

The decision to recommend flu vaccinations for all children six month and older weighs the benefits and risks associated with vaccinating children. A number of studies found a low risk of minor adverse events in vaccinated children, such as local skin reaction to injected vaccine, and wheeze or irritability after nasal dose of vaccine, and serious adverse affects, including hospitalization or death, were almost negligible.[67,68,69]

Although recommended for children under two, other issues exist when it comes to vaccinating very young children. The current flu vaccine is given annually, and young children are recommended to get two doses the first year for optimal results.[70] It is important to note that children are recommended to receive up to 16 different immunizations before turning two, and adding two more injections to an already crowded schedule can be difficult for parents. Traditionally in the United States, there has been a gap in vaccination rates for preschool aged children. Around 20 percent of preschoolers have gone without recommended vaccinates every year for the past three decades, leaving ap-

proximately two million children at increased risk of preventable diseases.[71] Rates of low vaccination are particularly a concern in minority and low-income communities, where it is often difficult to reach and communicate with parents before children enter a formal school system. Some reasons that contribute to this vaccination gap include: an underfunded and underutilized immunization registry system; public misperceptions about the importance of vaccines and their safety; and systemic issues, such as vaccine supply, distribution, and inadequate funding.

School-Based Actions to Reduce Exposure

CDC issued new guidance on school responses to influenza just before the start of the 2009-2010 school year.[72] CDC includes two action plans, the first is to be followed if the fall outbreak has similar severity as in the spring 2009, and a second set of guidance in the case that the fall outbreak is more severe than the spring 2009 outbreak. In each set of guidance, CDC recommends a series of activities to reduce exposure of students, faculty and staff to the flu viruses within the school setting.

The actions recommended for the current level of severity of influenza disease include ensuring that:

- Ill students stay home
- Students who fall ill during the school day be promptly isolated while awaiting parents to take them home
- All students are able to perform adequate hand hygiene
- Students are encouraged to practice respiratory etiquette
- Facility staff perform routine cleaning of frequently touched surfaces
- Students at high risk for complications seek early treatment if they have symptoms of flu
- Specialized schools serving students at high risk of complications consider selective school dismissals if flu is prevalent in the community.

Under conditions of greater severity, more disruptive non-pharmaceutical interventions might be recommended. These include active screening of students upon arrival, allowing high risk students or staff to stay home, household quarantine of well siblings of ill students, increasing the physical distance of students within the school, extending the isolation period for sick students, or school dismissals.

The most disruptive intervention to reduce school-based exposure to flu is school dismissal. The effect of school dismissal on reducing transmission in the school or in the community is difficult to measure. While observational studies and models have shown mixed results, the beneficial effect of school dismissal is most apparent in pandemics with a high proportion of disease among school-age children. Given the high attack rate among children in this pandemic and the frequent clusters and outbreaks reported in schools both in the spring and since schools started reopening in the late summer and early fall, school dismissals in this pandemic might be useful under conditions of increased severity.

After the initial outbreak, on May 1, 2009 CDC issued guidance recommending school dismissal when H1N1 infection was detected in any student.[73] Shortly after, as more information about H1N1 was collected and the virus was found to be less harmful than anticipated, on May 4 CDC released updated guidance recommending school closings only if the absenteeism of faculty or students became so large that it interfered with the school's ability to function.[74]

In the weeks following the first cases of H1N1 hundreds of schools closed across the United States. In response to school closings Kathleen Sebelius, the health secretary acknowledged that, "There is a large ripple effect. What happens to the parents? Where do those children go? Do you close the day care center if a younger sibling is there? Many schools' and communities' emergency plans will be put to the test during the weeks and months to come."[75]

Closing schools for up to two weeks triggers a number of social corollaries. Seeking alternative child care arrangements is especially complicated when the intent is to keep children separated from one another. Workplace absenteeism increases as parents need to stay home with children, who may or may not be ill. It is important to remember that U.S. schools provide more than educational services – including subsidized meals and before and after school care – which also are disrupted when a school closes. A large percentage of low-income families rely on food assistance programs like the National School Lunch and Breakfast program, and in the case of school closures many children could go hungry. The U.S. Department of Agriculture (USDA) is exploring contingency plans for alternative delivery of meals to students in the event of school closings.

In just the few days that schools were closed across the country, many state and local public health officials found the implementation of school closures to be difficult and burdensome on communities.[76] Children were being dropped off at libraries and community centers because so many parents lacked the sick leave to stay home with their children.

In a public opinion survey conducted by the Harvard School of Public Health, over half of parents polled said that school or daycare closures would cause them or someone in their household to miss work.[77] Forty-three percent said this kind of closure would likely cause a loss of income and money problems, and over a quarter of parents responded that having to stay home with children would cause them to lose their job or business. The poll also showed that school closures would have a disproportionate impact on minorities.

B. AT-RISK COMMUNITY ISSUES

Many of those who are likely to be affected most by a resurgence of H1N1 are vulnerable populations such as pregnant women, uninsured, and minorities. The elderly are not considered high-risk for H1N1, but they are a high-risk category for the seasonal flu and they often also have underlying medical conditions.

Individuals with mental illnesses, the homeless, and undocumented immigrants are also categories of special concern, as they are often underserved or un-served by the medical community. Undocumented individuals may not seek medical care due to lack of coverage and fear of potential legal repercussions.[78] This presented an issue in a number of communities during the spring outbreak of H1N1, and can be particularly problematic during an infectious disease outbreak, when the individual may be putting others in the community at risk by not seeking care.[79] ASTHO has developed an *At-Risk Populations and Pandemic Influenza: Planning Guidance for State, Territorial, Tribal, and Local Health Departments* to assist states in planning.[80]

1. Minority Populations

Multiple reports reveal that H1N1 has had a disproportionate effect on racial and ethnic minorities.

- In Chicago, a study found that from April through late July African-Americans were hospitalized at a rate of nine per 100,000, Hispanics at a rate of eight per 100,000 and whites at a rate of two per 100,000. Health officials say that the difference is most likely not genetic, but rather because some minorities suffer from more chronic conditions like asthma and diabetes that make them more vulnerable to the flu.
- African-American and Hispanic residents in Boston account for more than three of every four residents who have visited the hospital in the recent months because of H1N1.[81] In Boston, 71 city residents were hospitalized with swine flu – 49 percent of whom were African-American and 28 percent were Hispanic, double each minority group's presence in the city. The two groups also account for a disproportionate share of the 477 laboratory confirmed cases of H1N1 in Boston.

Disease specialists suggest that overcrowding in urban areas and underlying chronic conditions such as diabetes make African-Americans and Hispanics more prone to the complications of influenza.

Health workers in the city of Boston are pledging to improve outreach to the more vulnerable communities for the fall flu season. The Mayor of Boston, Thomas M. Menino, also promised that he would make it possible for all city employees to take two hours of paid work time to get flu shots when they become available.

Racial and ethnic minority communities tend to experience higher rates of injury, disease, traumatic stress, death and loss in public health emergencies. According to Drexel University's Center for Health Equality, the reasons behind these disparities include:[82]

- Historic societal patterns of neglect;
- Lower socioeconomic status;
- Culture and language barriers;
- Distrust of service providers;
- Lower perceived risk from disasters and limited preparation; and
- Reliance on informal channels of information.

A literature review of studies on the preparedness of racially and ethnically diverse communities found limited information regarding emergency preparedness and minorities.[83] Many studies that exist highlight problems with information, communication, and education.

- Currently, emergency preparedness information is disseminated primarily through the Internet, which is a problem because its use is often limited for minorities, particularly for people whose first language is not English. In fact, only one in three emergency preparedness websites include content in foreign language.
- One study also found that the mere translation of English-language material to other languages is not enough – often times the literal translation does not correctly translate – leading to miscommunication of the public health message.
- Communication messages to minority and immigrant populations must be targeted specifically to each group, according to a 2007 study published in the *Journal of Health Care for the Poor and Underserved*, because "cultural groups respond to risk and crisis communication on the basis of their perceptions and ways of thinking, and these differ from group to group."[84]

Mistrust of the Health System

In order to help minority communities be resilient, they must be provided with culturally appropriate information, resources, and training for emergency preparedness. After Hurricane Katrina, one study found that "a majority of African-Americans and Asians, and half of Hispanics feel they can no longer rely on the American system and its institutions to protect their family during a crisis."[85] Because of mistrust from minority populations toward the American health system, the best way to overcome cultural barriers and spread public health messages is through community based organizations.

Training community members as volunteer community health workers or health promoters is an important way to connect minority communities with the health care system and to ensure that important public health messages are received and understood.[86] Churches are another under-tapped resource in disseminating emergency preparedness information. Research shows that African-American ministers and their religious institutions played a huge role after Hurricane Katrina through: mobilization of resources, providing services to survivors, brokering relationships between individuals and the larger disaster response community, and acting as moral agents and social justice advocates on behalf of evacuees.[87]

Communities that have limited numbers of proficient English speakers are at a disadvantage when it comes to preparing for a pandemic. Not only does the language difference cause a barrier, but also the cultural differences. A pilot program in Seattle, Washington with medical interpreters assessed limited English proficient communities and found the following:

- Medical interpreters found a need for more disaster preparedness training and education in order to adequately do their job;
- Medical interpreters reported that limited English-proficient (LEP) communities are not prepared for disasters; and
- Medical interpreters said there is a need for culturally appropriate information and education.

Vaccinations

Although seasonal influenza vaccinations are fairly safe and inexpensive, disparities in those who are vaccinated exist in the United States. Minority groups have much lower rates of seasonal influenza vaccination compared with whites.[88] In 2004 and 2005, 66 percent to 69 percent of whites were vaccinated compared with 48 percent to 55 percent for Hispanics and only 45 percent to 50 percent for African Americans. Hispanics and African Americans also have higher rates of mortality from seasonal influenza and pneumonia compared with whites.

Some explanations for disparities in influenza vaccination include:

- Barriers to access such as cost, insurance status, and language differences;
- Underestimation of personal risk and misunderstanding of vaccination risks; and
- Mistrust toward the health care system.[89]

Yet, even after accounting for provider visits, access to care, socioeconomic status, health insurance, perceived health, chronic disease, and demographics, racial/ethnic differences in influenza vaccinations still exist.[90] A study of Medicare beneficiaries found that African Americans were significantly less likely than whites to report positive attitudes toward influenza vaccination. In order to increase minority vaccination rates interventions must address negative beliefs and misinformation. Individualized, culturally appropriate, evidence-based interventions were found to be effective in increasing vaccination rates among disadvantaged, racially diverse, inner-city populations. Prior to the health trial only 27.1 percent of participants had received an influenza vaccination, and at year four the rate had increased to 48.9 percent.[91]

2. Health Care Workers

Another at-risk segment of society is health care workers. In June 2009, CDC reported that 81 U.S. health care workers contracted the H1N1 influenza virus, about half of whom caught it on the job.[92]

Health care workers must take extra care to not spread the virus to their patients as well as protect their own health, and one easy way is to get the seasonal and H1N1 influenza vaccination. It may be more of a challenge than expected to encourage health care workers to get vaccinated. For instance, the seasonal flu vaccination rates have typically been low for health care workers. According to a study of a group of over 1,000 registered nurses in four states, only 59 percent reported receiving seasonal influenza vaccine during the 2005-2006 flu season.[93] The most common reason for not receiving a vaccine was concern about adverse reactions. Those most knowledgeable about the vaccination were more likely to receive a vaccination.

Advisory Committee on Immunization Practices (ACIP) recently released recommendations advising which populations should be prioritized to receive H1N1 vaccines in the fall.[94] Health care workers and emergency medical responders can be found at the top of the list. The list accounts for approximately 159 million people – about half the population – yet by mid-October at most only 52 million doses are expected to be available. In the case that the supply is not adequate, health care workers will be bumped from the highest priority group, but certain eligible health care workers will still be among the first vaccinated.

CDC and the Occupational Safety and Health Administration (OSHA) recently provided guidance for standards to protect health care workers in the case of a pandemic.[95] A survey developed by six trade unions representing health care workers found that many workplaces are not ready for pandemic influenza. More than one-third of respondents said that their workplace is at best "slightly ready" to address the needs of health care workers during a pandemic. Worker training and communication scored very poorly. Less than half of facilities surveyed reported they had been provided training on pandemic flu, had been communicated their employer's pandemic flu plan, had been taught how to recognize flu symptoms in themselves, or had conducted drills of their pandemic flu plan. Only 33 percent of respondents believed the majority of their employee members would show up to work during a pandemic.[96]

Various studies show that health care workers may not go to work during a pandemic for fear of becoming infected.[97] A study in 2005 of almost 6,500 employees in long-term care facilities and outpatient centers found that less than two-third of employees reported an ability to go to work in the case of a severe acute respiratory syndrome outbreak.[98] Another smaller study found that just barely more than half of employees of county health departments would report to work during an influenza pandemic.[99]

One way to decrease health care worker absenteeism during a pandemic is to put measures in place before the pandemic occurs. Protective measures will give employees confidence that their employer will protect them during a pandemic. Plans to protect employees include: personal protective equipment, identification and isolation of infected patients, identification of health care workers who will provide care for infected cases, worker training, and securing adequate supplies of safety equipment, antiviral drugs, and vaccine.[100] The Institute of Medicine (IOM) recently issued recommendations for how to best protect workers when there may not be adequate supplies, which is particularly of potential concern for N-95 respirator masks.[101]

Many health care workers visit their patients at home. Approximately 85 percent of the 1.5 million home health care workers are low-wage workers, represented mostly by women and minorities.[102] These home health care paraprofessionals provide personal assistance with activities such as bathing, toileting, and cooking. The number of patients cared for at home generally is three times the number of patients cared for in hospitals. Data from a 1997-1999 Current Population survey found that only half of home care aides had some form of health insurance.[103]

During a pandemic, home health care workers will be very important because many unpaid care providers may become ill or unable to continue providing care. Also, in order to increase the number of beds available during a surge many hospitalized patients will be discharged early and home health care workers will be able to help by offering their services during a pandemic.

PROVIDING VACCINATIONS AND HEALTH CARE WORKERS

On August 13, 2009 New York adopted a new regulation requiring health care workers in the state to be vaccinated for both seasonal and H1N1 influenza.[104] The regulation affects workers at hospitals, in home health care agencies and hospice care, but because of a technicality in the language it does not include nursing homes.

Until the new regulation, vaccinations for health care workers were only voluntary and fewer than half of health care workers were getting an annual flu shot. The regulation requires applicable workers to get the seasonal flu vaccine as well as the new H1N1 vaccine. Workers and volunteers who have any contact with patients will be required to get vaccinated -- including nurses, doctors, aides, and even nonmedical staff such as food service workers.

Shortly after the New York regulation, Massachusetts enacted a measure that requires hospitals and clinics to make the H1N1 vaccine available to all workers and certain volunteers.[105] Although most health care settings already have vaccines available, the measure "emphasizes the importance of being vaccinated to physicians, nurses and other health care workers." The Massachusetts Public Health Council also voted to allow dentists, pharmacists and paramedics to administer flu vaccinations in an effort to supplement the opportunities for individuals to get vaccinated.

3. The Elderly

Currently, there are an estimated 14 million people aged 65 or older, approximately 80 percent of whom live with some level of disability according to the 2000 U.S. Census.[106]

During seasonal influenza approximately 90 percent of severe and fatal cases occur in people 65 years of age or older, but in the current outbreak, the elderly are not at the top of the list of vulnerable populations – children are 14 times more likely to be infected than the elderly.[107] However, it is important that the elderly are highly encouraged to get the seasonal flu vaccination.

There are also ongoing concerns for vaccinating and providing treatment for the elderly when they have limited mobility. In a public health emergency, "conditions such as stress, the lack of food or water, extremes of heat or cold, and exposure to infection can contribute to the rapid worsening of a chronic illness that was under control before the event," according to *Preventing Chronic Disease*.[108] In addition to chronic conditions, older adults may suffer from impaired mobility or cognitive ability, poor vision or hearing, and economic limitations.

Many elderly live in nursing homes or in retirement communities, which are densely populated communities where infectious diseases can spread rapidly. Many facilities provide seasonal flu vaccine, but since the elderly are not on the priority list for H1N1 vaccine, they will not receive the vaccine early in season, so institutional care facilities must work hard to promote non-pharmaceutical interventions to limit the spread of disease. In addition, many elderly have underlying health conditions, which can make them susceptible for complications when they contract a disease.

Significant numbers of seniors do not live in institutionalized care settings, but still often have limited mobility. Ensuring care for seniors with limited mobility and reaching them with vaccinations presents a series of challenges. Public health departments often include senior outreach plans, but these are difficult to implement in regular times and will be even more difficult during a widespread outbreak where officials will be dealing with numerous challenges across a range of populations.

4. Pregnant Women

Observations from H1N1, past pandemics, and seasonal influenza show that the flu can be more severe for pregnant women.

According to a study conducted shortly after the initial outbreak of H1N1, pregnant women infected with H1N1 were more likely to be hospitalized from the flu, and they also had a greater chance of death.[109] The findings come from data reported between April 15 and May 18, 2009, during which time there were 34 probable cases of H1N1 in pregnant woman, 11 were admitted to the hospital and six of the cases resulted in death.[110] Pregnant women make up one percent of the U.S. population, but at the time of the study they accounted for six percent of all deaths from H1N1.

The study acknowledges the short time frame and small pool of subjects, but concludes that, "Pregnant women might be at increased risk for complications from pandemic H1N1 virus infection. These data lend support to the present recommendation to promptly treat pregnant women with H1N1 influenza virus infection with anti-influenza drugs."[111]

For years CDC and the American College of Obstetricians and Gynecologists have urged expectant mothers to get the seasonal influenza vaccine, but less than 15 percent follow the recommendation.[112] Many women are hesitant to get the vaccine for fear of injury to the fetus. In new guidance, CDC recommends that women exhibiting flu-like symptoms should be immediately treated with antiviral medications.[113]

VI. RECOMMENDATIONS

> "This is not about raising alarms or stoking fears, but about being prepared."
>
> Kathleen Sebelius, HHS Secretary[114]

During infectious disease outbreaks, public health departments serve as the front lines for identifying, monitoring, and developing strategies for containing outbreaks. Federal, state, and local health departments, health care providers, businesses, schools, and communities around the country are working tirelessly to prepare for H1N1 and the seasonal flu this fall and winter.

The investments made over the past several years to bolster pandemic preparedness in the United States have led to tremendous improvements in federal, state, and local response capabilities, including greatly enhancing vaccine research and development and the stockpiling of antiviral medications. And the efforts since the spring H1N1 outbreak, including $1.9 billion in emergency supplemental funding and an additional $5.8 billion in contingency funds, have filled in gaps to support vaccine production, upgrading state and local capabilities, improving surveillance systems, and federal preparedness.

Gaps remain, however, in some critical areas. Health officials inherited many legacy problems, including the need to address surge capacity and weaknesses in the public health infrastructure, which hinder their ability to do their jobs as effectively as possible.

Many public health preparedness experts believe the best way to gauge how well communities are prepared for emergencies is through drills or exercises. The H1N1 outbreak provides a real-life opportunity to assess and learn the strengths and vulnerabilities of preparedness capabilities all around the country. As of now, the H1N1 virus is considered relatively mild, so while the number of Americans who could become sick, hospitalized, or even die will be significant, it provides the chance to see how well-prepared communities are during a more controlled outbreak as opposed to a worse-case scenario.

In addition, federal, state, and local governments and the health care community have already learned a great deal from their experiences during the Spring H1N1 outbreak. What the rapid response to the H1N1 crisis showed is that the large federal investment in pandemic planning and stockpiling antiviral medications paid off. All 50 states and many U.S. cities had developed comprehensive pandemic influenza plans over the last several years. State and local emergency preparedness planners had exercised these plans and learned from them, which helped them respond to the outbreak effectively. We also saw a willingness on the part of both federal and state public health officials to adapt their pandemic response plans based on the real-life situation on the ground and on the science of the pandemic. For example, CDC updated and revised its school closure guidance as it became apparent that H1N1 was circulating widely in communities and shuttering schools and sending school kids home was having no effect on containment. Federal and state officials also were able to provide clear, straightforward information to the public, which was essential for allaying fears and building trust.

At the state and local level, public health departments and medical systems developed innovative practices to deal with the H1N1 outbreak, including the use of alternate care sites to screen, sort, diagnose, and treat patients complaining of flu-like symptoms. In some cases, these sites were tents set up outside hospitals, in other cases these were virtual sites or telephone call numbers, staffed by trained medical personnel, who could answer questions and ease the burden on hospitals. State governments also worked hard to reach out to vulnerable populations, including low-income residents and those with limited-English proficiency. The Los Angeles County Health Department issued fact sheets in 11 languages. We also saw local governments rely on volunteer health care workers to staff some of these alternate care sites and call centers. Again, these successes highlight the importance of the investment in pandemic and all-hazards preparedness.

The following are recommendations that address: some immediate concerns that must be considered for responding to the current H1N1 season and for a third wave of H1N1 that will likely emerge next year; and longer term recommendations that will help shore up core public health systems to better prepare the country for future emergencies and disease outbreaks. Investments made in preparing for and responding to H1N1 will also have long-lasting impact in upgrading the nation's public health system.

SHORT-TERM RECOMMENDATIONS:

Vaccination Campaigns

- **Refine plans for rapid distribution and administration of vaccinations:** H1N1 will present the first mass vaccination effort to be conducted in a short time frame in modern U.S. history. States and localities should continue to revise plans for the most effective ways to provide vaccinations once they are available. Federal, state, and local officials need to identify if additional resources are needed to pay for administration of vaccines, especially if third party payers do not provide adequate coverage for the insured.

- **Special efforts must be made to reach out to encourage young adults, minorities, and other at-risk groups to get vaccinated:** Health departments must intensify efforts to encourage high-risk individuals to get H1N1 vaccinations. Young adults, pregnant women, and minorities, in particular, traditionally have low flu vaccination rates and often do not know where or how to get vaccinations. In addition, a significant percentage of young adults do not have health insurance, which could deter them from going to get vaccinations. Outreach to minority populations must reflect culturally-competent communications and be delivered by respected, trusted, and culturally-competent messengers.

- **Vaccination campaigns must continue past the fall to prepare for a potential third wave outbreak:** The fact that the H1N1 vaccine will likely not be available to the entire population in October and that the virus is proving to be mild so far could mean that efforts are not made to try to encourage the entire population to get vaccinations. It is likely, however, that a third wave outbreak of H1N1 will occur, and it could become more virulent. Federal, state, and local health departments should make plans to encourage all Americans to get vaccinated even past the height of the fall and winter outbreak, in case there is a third wave H1N1 outbreak and to help people build immunity for potential future related flu strains.

- **Vaccine tracking systems must be enhanced to monitor for adverse reactions:** A better system is needed to track when vaccinations are administered. This is crucial for determining if anyone is having adverse effects related to the vaccine.

- **Payment systems for vaccine administration must be improved:** While the federal government will pay for the purchase and distribution of vaccines, payment for the administration of vaccines will be the responsibility of insurance providers, state or local health officials, or in some cases, it possibly will become an out-of-pocket cost for individuals. Clear policies and effective systems must be established as quickly as possible to ensure that health departments, health care providers, clinics, pharmacies, and other organizations who will be administering the vaccines to individuals will receive compensation.

  - ▲ Medicare and Medicaid should ensure their policies cover the administration of H1N1 vaccines and out-of-network care for H1N1 related illnesses and to allow providers to bulk bill for the administration of vaccines to their beneficiaries through roster billing.

  - ▲ DOL should communicate with ERISA-governed health benefit plans offered by private employers to encourage them to waive co-pay requirements for vaccines and out-of-network restrictions and to provide information to state and local health departments to help with their vaccination campaigns in communities.

  - ▲ OPM and DOD should work with their contractors to waive co-pay requirements for vaccines and out-of-network restrictions and to provide information to state and health departments to help with their vaccination campaigns in communities.

  - ▲ The Treasury Department and IRS should remind nonprofit hospitals that immunizations are a key community benefit, and the importance of meeting community benefit standards as part of retaining tax-free status. They should encourage nonprofit hospitals to be an active part of vaccination campaigns in communities, making their facilities and staff available to work with state and local health departments.

Stocking Medical Supplies and Antivirals

- **Replenish and update equipment in the SNS:** In the spring, 25 million N-95 respirator masks were deployed from the SNS to states, but this inventory was never restocked, reportedly due to lack of dedicated funding. The current stockpile of 79.7 million N-95s is considered to be severely lacking according to a number of experts and now because of high demand, the product is on back order.
- **States should purchase enough antiviral medications to care for at-risk patients in the immediate term:** CDC has recommended that antiviral medications be used only for people with severe cases of H1N1 or for people with underlying health conditions. Many states have purchased their full share of antiviral medications, however 13 states have purchased less than half their share of federally-subsidized antiviral medications for use during a pandemic outbreak. States that have not purchased significant shares of their allotment of antiviral should at least take action to purchase enough to be able to care for at-risk patients or patients with severe cases of H1N1. It is unclear how severe the H1N1 virus will prove to be with high-risk populations this fall and it will likely re-emerge in a third wave, so states should be prepared by having enough medications to protect their citizens if needed. Over the long-term, antiviral purchasing policies should be updated to make purchasing antiviral, vaccines, and equipment for the SNS a federal responsibility. Until that happens, states should take action to ensure they have enough medications to protect their citizens.

Surveillance

- **The surveillance recommendations in the President's Council of Advisors on Science and Technology (PCAST) report should be fully-funded and implemented:** Disease surveillance systems in the United States have been out-of-date for decades. Having rapidly available data that is easily accessible is essential to allow experts to track the course and severity of the disease, determine who is most at risk when, identify when additional antivirals or equipment are needed in a particular community, detect adverse reactions to the vaccine, or learn if the disease is becoming resistant to antivirals. HHS officials have been working hard to improve systems so they can monitor the spread of H1N1, and the PCAST report identifies specific ways to continue to upgrade H1N1 surveillance systems and capabilities to link systems among hospitals, health departments, and other health providers, to compile real-time data. Enough resources should be devoted to ensuring these recommendations are carried out as swiftly as possible, and officials should find ways to leverage these capabilities and lessons to modernize all U.S. disease surveillance systems.

Providing Care in Communities

- **States and localities should follow CDC guidance for school and day care closures:** Communities around the country should follow the federal guidance on school closures and find the balance between limiting the spread of disease and causing social disruption by closing schools.
- **An emergency health benefit should be established:** Congress should establish an emergency health benefit to ensure hospitals and health care providers can function and get compensated for providing care for the uninsured and underinsured during a public health emergency, to maintain the solvency of the healthcare system and ensure all patients receive needed care.
- **Emergency sick leave should be made available:** The federal government should clarify whether the Department of Labor's Disaster Unemployment Assistance Program would cover workers without sick leave who self-quarantine in the event of a pandemic flu. Congress should pass legislation that would require employers with 15 or more employees to offer a minimum of seven paid sick days each year, to be used to deal with individual medical needs or to care for sick family members.
- **Health providers and health departments should develop and disseminate strong public messages about ways to practice good hygiene and understand symptoms and remedies:** Hospitals and health providers should develop a public messaging system to give people information about symptoms and remedies to prevent unnecessary trips to the emergency room and they should have pandemic plans in place to protect employees.

- **Federal, state, and local health departments should share lessons, innovations, and resources:** Better systems should be developed for real-time sharing of approaches and innovations across different states, communities, and jurisdictions. In addition, neighboring communities should share and coordinate to the extent possible plans for policies for providing care and information, and if necessary, resources.
- **HHS and DHS should institute a policy that no one who contracts H1N1 should be denied care:** HHS and DHS should issue a joint statement outlining a policy that undocumented individuals who receive care for H1N1 will not be subject to enforcement action in order to ensure that people who are sick will seek care, which helps prevent the spread of the disease and also limits emergency room visits by patients who delay seeking care until they are severely sick.
- **The federal government should lift restrictions to allow states to reassign employees supported by federal funds to be able to help with the H1N1 response:** Federal waivers should be granted to release federal categorically funded program staff to assist with response at the discretion of local health officials.
- **Health care personnel should follow the guidance from HHS and OSHA on the best way to protect health care personnel:** Given there is likely going to be a shortage of N-95 respirator masks in many communities, officials should clearly communicate guidance to health facilities on the best way to allocate personal protective equipment and reduce the need for respirators among health care workers.

LONG-TERM RECOMMENDATIONS:

The following are a series of recommendations that would help shore up the nation's core public health system, which is essential for responding to future and ongoing health emergencies. In addition, as lessons are learned from the H1N1 response, these should be used to update federal, state, and local preparedness planning. There is still the threat of the H5N1 "bird" flu circulating and ongoing concerns about future infectious disease outbreaks, bioterrorism, and natural disasters.

Surge Capacity

- **Disaster Standards of Care:** The IOM recently issued guidance for establishing standards of care for use in disaster situations. The guidance is a "preliminary framework" that describes the key elements that should be included in disaster standards of care protocols and a template matrix for state and local health departments for developing specific guidance for health providers to use when there is a major influx of patients. Major disaster standards of care issues include surge capacity planning for when health providers are overtaxed, space is limited, and equipment is scarce and issues of alternate care sites (such as public arenas or malls), as well as legal and ethical issues, which should be carefully considered in advance instead of during the time of a crisis. The H1N1 outbreak provides a mass test of the health care system, however, because the virus is currently mild, it will allow for adjustments and modifications, including learning how to adapt the system for more severe emergencies.
- **Regional Coordination:** Hospitals, local health departments, and emergency management agencies should work to establish more regional consortiums to organize and plan for public health emergencies. Such regional collaboration can lead to more efficient use of resources among hospitals and health departments, including personnel, and facilitate the sharing of promising practices. This should include all federal resources active in each region.
- **Surge Workforce:** Hospitals, health care providers, and public health departments should redouble efforts to recruit additional medically-trained staff for times of emergency. This includes creating incentive systems for employees to work overtime and to find trained volunteers who can be screened and would be ready and reachable during times of emergency. Issues of liability protection must also be addressed. Many volunteers and private entities have expressed reluctance to participate in emergency health response efforts due to concerns about liability. A number of states have passed legislation to protect volunteer health professionals. The federal government could also take measures to extend liability protections if Congress amended the Public Health Service Act to provide Federal Tort Claims Act protection to qualified health professionals when they are activated during emergencies, and Congress could also con-

sider a minimum protection to address liability issues for businesses and non-profit organizations who work with government officials responding to emergencies.

- **Hospital Plans:** Hospitals and health care providers must have clear and practiced plans in place to respond to emergencies or a major influx of patients. Planning must include how to provide continued care for daily emergencies and chronic care during emergencies, separating infectious patients from others in intake and emergency departments, and discouraging the "worried well" from overcrowding emergency rooms.

Fund and Modernize Core Public Health

- **A fully-funded and reliable funding stream is needed to support public health preparedness:** Public health infrastructure has been underfunded for decades, according to assessments from CDC, IOM, and other experts. Federal funding for core state public health preparedness was cut 25 percent between FY 2005 and 2009. It is important that states have a reliable, dedicated, and sustained level of funding that is adequate to meet core capabilities and to continue to keep pace with new technologies that can help them better meet the needs of communities. Congress should assure a robust, reliable funding stream through health reform legislation for all core public health activities.
- **A mechanism should be created to ensure that vaccines, medications, and equipment in the SNS are replenished and upgraded as needed:** Right now, there is no systematic way to ensure that new supplies are purchased to replace used items so the country will be prepared for the next emergency. After the H1N1 outbreak, it will also be essential that the SNS and states replenish the supply of antiviral medications to prepare for the potential threat of future outbreaks.
- **All U.S. disease surveillance systems must be modernized:** The nation's disease surveillance and health tracking systems are severely out-of-date and do not provide real-time or easily accessible data. The upgrades to surveillance during the H1N1 should be used to leverage upgrading the rest of U.S. disease surveillance capabilities. The nationwide implementation of health information technology systems through the American Recovery and Reinvestment Act and health reform proposals must take into account the need for public health data accessibility.
- **Additional core public health infrastructure capabilities must be modernized:** There is no system in place to ensure that the basic public health systems and equipment keep pace with advances in science and technology. There needs to be a systematic way to ensure that the technology and equipment that support core functions, like laboratory testing and communications, are routinely updated.
- **Pandemic plans must be continually revised:** As the emergence of H1N1 demonstrated, new strains of flu can emerge quickly and rapidly. In addition, experts are still concerned that the H5N1 "bird" flu could potentially become a human pandemic. It is essential that the National Strategy for Pandemic Influenza and state plans be continually revised. Plans should particularly be updated to incorporate the lessons learned during the H1N1 outbreak and response.

MAJOR FLU OUTBREAKS OF THE 20TH CENTURY[115]

1918 -- The "Spanish" flu pandemic killed 500,000 in the United States, 50 million worldwide.

1957-58 -- An outbreak spread from China across the globe, killing approximately 70,000 in the United States. In April 2005, a company testing laboratory proficiency mistakenly distributed samples of this pandemic strain to laboratories worldwide, triggering worldwide concern until all samples were accounted for and destroyed.[116]

1968-69 – The "Hong Kong" flu, the most recent pandemic, affected millions worldwide and disrupted world economies.

1997 – The first identification of the avian "bird" flu H5N1, which remains active in Asia.[117]

2009 – As of August 13, 2009, the H1N1 virus was reported in over 175 countries, with nearly 5,000 hospitalizations and more than 475 deaths in the United States.

APPENDIX A: METHODOLOGY FOR SEASONAL FLU VACCINATIONS

Data for this analysis was obtained from the Behavioral Risk Factor Surveillance System (BRFSS) dataset (publicly available on the web at cdc.gov/brfss).[118] To conduct the analyses, TFAH contracted with Edward N. Okeke, MBBS, MPH at the Department of Health Management and Policy at the University of Michigan School of Public Health. The variable of interest was the FLUSHOT variable.[119] Researchers weighted data from 2008 using sample weights provided by the CDC in the dataset and dropped observations where either the survey participant answered, "don't know" or refused to answer. These accounted for less than 0.5 percent of all observations. Researchers then calculated flu vaccination rates for three different population samples – individuals aged 18-49, individuals aged 50-64, and individuals 65 and older – for each state. The research team reported 2008 flu vaccination rates for each sub-sample, along with standard errors and 95 percent confidence intervals. Respective sample sizes for each sub-sample were 151,903, 130,713, and 121,459.

APPENDIX B: POTENTIAL PANDEMIC INFLUENZA CASES, HOSPITALIZATIONS AND BED CAPACITY

Potential Pandemic Influenza Cases, Hospitalizations and Bed Capacity						
	Pandemic at a 15% Attack Rate			Pandemic at a 25% Attack Rate		
State	Cases	Hospital Admissions	Bed Capacity at Week 5	Cases	Hospital Admissions	Bed Capacity at Week 5
Alabama	689,855	9,654	23%	1,149,758	16,089	39%
Alaska	100,508	1,220	25%	167,513	2,034	41%
Arizona	924,948	12,584	50%	1,541,580	20,973	84%
Arkansas	421,631	5,931	22%	702,718	9,885	36%
California	5,468,632	72,011	54%	9,114,387	120,018	89%
Colorado	713,007	9,397	38%	1,188,344	15,662	63%
Connecticut	525,721	7,416	63%	876,202	15,430	132%
Delaware	128,021	1,799	87%	213,369	2,998	145%
D.C.	87,230	1,244	20%	145,383	2,074	33%
Florida	2,713,483	40,742	34%	4,522,472	67,903	57%
Georgia	1,404,591	18,149	33%	2,340,985	30,249	56%
Hawaii	192,825	2,747	61%	321,375	4,579	102%
Idaho	219,970	2,915	28%	366,616	4,859	47%
Illinois	1,924,796	26,114	31%	3,207,993	43,524	52%
Indiana	947,028	12,957	24%	1,578,380	21,595	41%
Iowa	447,313	6,408	22%	745,521	10,679	36%
Kansas	414,611	5,713	18%	691,019	9,522	31%
Kentucky	630,911	8,775	22%	1,051,519	14,625	37%
Louisiana	643,165	8,735	20%	1,071,942	14,558	34%
Maine	198,236	2,898	36%	330,394	4,830	59%
Maryland	842,359	11,439	61%	1,403,932	19,065	102%
Massachusetts	965,579	13,689	47%	1,609,298	22,816	79%
Michigan	1,514,346	20,822	34%	2,523,911	34,703	56%
Minnesota	775,065	10,615	29%	1,291,775	17,691	48%
Mississippi	436,581	5,919	15%	727,635	9,864	25%
Missouri	876,407	12,252	26%	1,460,678	20,419	43%
Montana	141,695	2,017	21%	236,158	3,361	34%
Nebraska	265,250	3,675	19%	442,083	6,126	31%
Nevada	374,329	4,988	59%	623,882	8,314	98%
New Hampshire	197,234	2,751	36%	328,724	4,585	60%
New Jersey	1,308,684	18,219	43%	2,181,140	30,365	72%
New Mexico	293,190	3,974	40%	488,650	6,624	66%
New York	2,895,927	40,603	46%	4,826,546	67,671	77%
North Carolina	1,328,476	18,199	41%	2,214,126	30,331	68%
North Dakota	95,380	1,378	14%	158,967	2,296	23%
Ohio	1,721,701	24,098	30%	2,869,502	40,163	50%
Oklahoma	536,882	7,446	24%	894,803	12,410	41%
Oregon	555,114	7,781	46%	925,190	12,968	76%
Pennsylvania	1,866,093	27,245	33%	3,110,155	45,409	55%
Rhode Island	160,142	2,296	61%	266,903	3,827	102%
South Carolina	648,187	8,997	40%	1,080,312	14,995	66%
South Dakota	117,288	1,655	16%	195,480	2,758	26%
Tennessee	905,820	12,577	26%	1,509,701	20,962	43%
Texas	3,526,167	45,123	28%	5,876,946	75,205	47%
Utah	382,509	4,645	36%	637,516	7,742	59%
Vermont	93,586	1,339	46%	155,977	2,232	77%
Virginia	1,146,433	15,656	43%	1,910,721	26,093	72%
Washington	959,370	13,060	46%	1,598,950	21,767	76%
West Virginia	272,771	4,030	21%	454,618	6,717	34%
Wisconsin	833,476	11,655	32%	1,389,127	19,426	53%
Wyoming	77,251	1,065	17%	128,751	1,775	28%

*Based on the CDC's FluSurge model program. Estimates rely on FluSurge 2.0 Beta Test Software, created by the CDC. More information about the model is available at http://www.cdc.gov/flu/flusurge.htm.

This scenario examines what would happen during a mild pandemic outbreak. The severity for this type of outbreak is based on the 1968 flu pandemic, which is considered relatively mild. The factors in the FluSurge model are set to assumptions based on the 1968 pandemic. These default settings assume an outbreak would be 8 weeks in duration and 35 percent of the population would become ill. The data for the age demograhics are from the Census Bureau's Current Population Survey, 2006, available at http://www.census.gov/. The bed statistics are based on the total number of licensed 2006 hospital beds (B) (which is available through Kaiser Family Foundation's State Health Facts, available at http://www.statehealthfacts.org/cgi-bin/healthfacts.cgi) and the typical hospital bed occupancy rates (R) (available for 2006 from CDC data and are available in the chart book, Health, United States, 2008). To determine the usual number of usual available beds, TFAH used the following formula – ((StatePop/1000) * B) x (1-R).

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ACKNOWLEDGEMENTS

Trust for America's Health is a non-profit, non-partisan organization dedicated to saving lives by protecting the health of every community and working to make disease prevention a national priority.

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TFAH thanks the reviewers for their time, expertise, and insights. The opinions expressed in the report do not necessarily represent the views of the individuals or the organization with which they are associated.

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This report is supported by a grant from the Robert Wood Johnson Foundation. The opinions expressed in this report are those of the authors and do not necessary reflect the views of the foundation.

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